



CITY OF MANCHESTER.

REPORT

ON THE

Health of the City of Manchester,

1897.

BY

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Public Health Office,  
Town Hall, Manchester,  
September 23rd, 1898.

*My Lord Mayor, Aldermen, and Councillors.*

I have the honour to submit to you the Report on the Health of Manchester for the year 1897.

It may be assumed that the increase of population does more than keep pace with the estimate of the Registrar-General. The Medical Officer of Health's estimate of the death-rate for the year is 22·4 per 1,000 living, so that the figure for two successive years is under 23 per 1,000, a fact which gives us hope that a permanent improvement is in progress.

The death-rate is in excess at ages 0-5. At higher ages it is lower than in recent years. The excess at ages 0-5 is due to concurrent high rates from Summer Diarrhoea and Measles.

In this report we have to record the inception of bacteriological examination by Professor Delépine of specimens of blood taken from cases of Enteric Fever, an innovation which has worked with remarkable success, owing in large measure to the hearty co-operation of the medical profession.

Under Scarlet Fever there falls to be mentioned the practical working out of a policy for the prevention of cases occurring at the home subsequent to the return of members of the household who have been treated at the Fever Hospital.

An effort has also been made to ascertain to what extent and in what manner Scarlet Fever is propagated in school.

Under Diphtheria there appears the continued success of the bacteriological procedures in connection with the disease.

The Sanitary Committee have reason to be highly gratified with the result of their action in respect of the diseases mentioned, and to feel an encouragement to take further practical advantage of Scientific discovery.

With regard to Measles, we have now arrived at a satisfactory system of co-operation with the School Board, to whom the Health Department is indebted for their assistance.

I have thought it advisable to make the Council acquainted with the recent knowledge which has been arrived at in regard to the influence of polluted soil in fostering Enteric Fever, and, doubtless, other diseases as well.

The influence of defective privy accommodation in the causation of disease appears in various parts of this and of previous reports.

A commencement has now been made in dealing with Manchester cowsheds, and it will be my endeavour to devise such improvements as will, with the least possible disturbance, render the cowsheds sanitary, when it appears possible to remedy the defects existing.

Short sections are devoted to the subjects of Fever Administration, Summer Diarrhœa, Unhealthy Dwellings, and Bakehouses.

As regards those highly-important diseases Tuberculosis and Summer Diarrhœa, the recommendations of the Royal Commission on Tuberculosis if they result in legislation will be highly beneficial.

A report on Monsall Fever Hospital is given, from which it will be seen that the fatality in 1897 compares favourably with the fatalities in recent years.

Much attention has been bestowed by the Hospital Sub-Committee and by the Sanitary Committee on that Institution during the year 1897, and it is permitted to believe that their labours will result in great benefit to the Hospital. A proposal for a Smallpox Hospital will be submitted at an early period.

I have been favoured with brief reports in reference to the Sanitary work of some other departments by the Officials responsible.

In particular, the report of the Sanitary Superintendent (Mr. A. T. Rook) is necessary to convey any idea of the great amount of useful work which the Sanitary Committee and its branches are doing. For example, a very large amount of excellent work is being done by the House Drainage Department, which is under the City Surveyor, though attached to the Sanitary Department.

In the preparation of this report I am indebted to my Clerks for valuable aid. In particular I am indebted to Mr. T. L. Ellwood for bringing together the particulars relating to Measles and to Fever Administration, as well as to Mr. W. H. Roos for the care and zeal which he has put into the preparation of the Statistical portions.

I have the honour to be,

My Lord Mayor and Gentlemen,

Your obedient Servant,

JAMES NIVEN,

Medical Officer of Health.



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# STATISTICAL.

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The more outstanding figures relating to the year 1897 are as follows :—

Estimated population .....	536,426
Persons married in Manchester, Prestwich, and Chorlton Unions .....	11,494
Annual rate of persons married per 1,000 of population.....	17·8
Births ... { Males..... 8,962 } { Females..... 8,667 }	17,629
Annual rate of births per 1,000 of the population...	32·9
Deaths ... { Males..... 6,263 } { Females..... 5,727 }	11,990
Annual rate of mortality per 1,000.....	22·4
Excess of registered births over deaths .....	5,639
Estimated increase of population during the year	4,729

The principal causes of death during the year were :—

Bronchitis .....	1,099	Cancer .....	396
Pneumonia .....	1,164	Old Age .....	236
Tubercular Disease .....	1,620	Measles .....	628
Diarrhoea and Simple Cholera .....	964	Whooping Cough.....	299
Diseases of the Circula- tion .....	932	Debility, Inanition .....	689
Diseases of the Diges- tive System .....	552	Premature Birth .....	310
		Convulsions .....	213
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If we examine the marriage-rates in England and Wales as given for successive years in the Reports of the Registrar-General, we find, as Dr. Ogle pointed out, that the table of exports of British produce corresponds fairly closely with that of marriage-rates, the rise and fall of exports preceding by one year the rise and fall in the marriage-rate.

The marriage-rate relates to England and Wales, while the exports are for the whole of Great Britain, so that the comparison is not a strictly accurate one. The birth-rate does not follow the course of trade so closely, although there is a tendency for the birth-rate to rise or fall a year after the marriage-rate.

There is, however, a sufficient degree of correspondence to indicate that an increase in exports of British produce per head of population is a strong factor in the increase of the population.

In Manchester we have to consider rather the conditions as they affect an industrial population, and the evidence obtained by a comparison of the birth-rates in different districts points strongly to the influence of prosperity in leading to an increase of the population. Conversely a decrease in the birth-rate may be taken to mean that in the recent past a check has been sustained in the course of the general prosperity. Still more is such the case when the marriage-rate is diminished.

Now on referring to Table F in the Appendix, it will be seen that the marriage-rate, which had ascended in Manchester steadily since 1893 from the low rate of 16 per 1,000 to 18·3 per 1,000 in 1896, was in 1897 diminished to 17·8 per 1,000, which is nevertheless the highest marriage-rate since 1884 with the exception of that for 1896.

The birth-rate, on the other hand, which responds to a somewhat more distant influence, was slightly higher than in 1896.

The birth-rate is, of course, partly influenced by the marriage-rate; partly by the immediate influences at work apart from the effect of previous marriage-rates.

We may conclude that, in all probability, the wave of prosperity in Manchester had temporarily ceased to flow quite so rapidly in 1896 as it had been doing in some previous years.

The factor which affects the artisan more than any—as a rule—is the wages he is earning. This scarcely admits, however, of a brief statement.

Probably the next most important is the price of food. It will be seen from Table I. that in 1897 there is again a marked increase in the price of flour.

On the other hand, fine beef and mutton are cheaper, and I understand there is a likelihood of pork becoming cheaper. House coal was also cheaper than it had been since 1889.

In spite of the rise in the price of flour, it is doubtful whether, taking one food stuff with another, there was any decline in the purchasing power of wages in 1897.

TABLE 1.—TOWNSHIP OF MANCHESTER.—PRICES PAID BY THE GUARDIANS  
FOR FLOUR, BUTCHERS' MEAT, AND COAL; ALSO THE AVERAGE NUMBER  
OF PERSONS IN RECEIPT OF RELIEF DURING THE YEARS 1887-1897.

YEAR ENDING	PRICES OF PROVISIONS						PAUPERISM		BIRTH- RATE PER 1,000
	Flour per Sack of 28lbs.	Butchers' Meat, per lb.			Coal, per ton		Average number of Paupers relieved in each week		
		Beef		Mutton	Engine	House	Indoor	Outdoor	
		Coarse	Fine						
1887	25/2 to 30/6	-/3 <sup>3</sup> / <sub>4</sub>	-/6 <sup>1</sup> / <sub>2</sub>	-/6 <sup>1</sup> / <sub>2</sub>	5/6	8/4	3123	877	33·9
1888	24/- to 29/3	-/3 <sup>3</sup> / <sub>4</sub>	-/6 <sup>1</sup> / <sub>2</sub>	-/6 <sup>1</sup> / <sub>2</sub>	5/5	8/3	3130	713	33·3
1889	24/11 to 31/2	-/4 <sup>1</sup> / <sub>2</sub>	-/6 <sup>1</sup> / <sub>2</sub>	-/6 <sup>1</sup> / <sub>2</sub>	5/8	8/7	3037	632	33·1
1890	24/9 to 29/11	-/5	-/7	-/7	7/-	9/9	2998	498	31·8
1891	27/3 to 28/11	-/4 <sup>1</sup> / <sub>4</sub>	-/6 <sup>1</sup> / <sub>2</sub>	-/6 <sup>1</sup> / <sub>2</sub>	8/8	11/2	3118	466	33·8
1892	26/4 to 28/5	-/4	-/6 <sup>1</sup> / <sub>4</sub>	-/6 <sup>1</sup> / <sub>4</sub>	7/6	10/2	3251	551	33·4
1893	21/8 to 25/1	-/3 <sup>7</sup> / <sub>8</sub>	-/6 <sup>1</sup> / <sub>4</sub>	-/6 <sup>1</sup> / <sub>4</sub>	6/5	10/0	3277	586	33·4
1894	17/2 to 23/9	-/3 <sup>3</sup> / <sub>4</sub>	-/6	-/6	7/1	10/10	3328	395	31·8
1895	15/6 to 21/-	-/3 <sup>3</sup> / <sub>4</sub>	-/6	-/6	5/6	10/3	3343	618	33·4
1896	16/6 to 24/-	-/3 <sup>5</sup> / <sub>8</sub>	-/5 <sup>3</sup> / <sub>4</sub>	-/5 <sup>3</sup> / <sub>4</sub>	5/7	9/1	3348	533	32·8
1887	17/3 to 33/9	-/3 <sup>1</sup> / <sub>2</sub>	-/5 <sup>5</sup> / <sub>8</sub>	-/5 <sup>5</sup> / <sub>8</sub>	5/9	8/8	3476	697	32·9

GENERAL MORTALITY STATISTICS.

In the Report for 1896, I alluded to the increase of population accruing to the City from two distinct sources : from the growing prosperity of the Ship Canal, and from the increasing importance of the City as a distributing centre.

In 1897, an estimate was formed of the population on the basis of the number of inhabited houses as obtained from the rate books. The number of inhabitants per house was assumed for each district to be the same as at the Census-taking. In this way an aggregate population was obtained of



536,235, which is in excess of the Registrar-General's estimate, and practically corresponds with 536,426, the estimate of the Medical Officer of Health to the middle of 1897, which estimate includes a proportion of the populations of certain Poor Law Institutions outside the Municipal Boundary. Now the houses in the City are nearly all occupied, and rents are higher than they were at the Census, consequently we may assume that the number of persons per house has somewhat increased. On this assumption, the population would be, perhaps, about 540,000. That the increase is not a very great one may, with some probability, be inferred from the fact that the birth-rate is not high.

The Registrar-General's computation of the death-rate for the year 1897 is 23·1; that of the Medical Officer of Health 22·4. The reason for the discrepancy is this, that whilst in the Medical Officer of Health's Report the deaths of persons dying in Manchester Institutions, and not belonging to the City, are excluded, and the deaths of Manchester patients in extra Municipal Institutions outside the City are included, the death-rates of the Registrar-General are calculated on the deaths of all persons dying within the City. The populations on which the rates are calculated are also different, the Registrar-General not including the Manchester population living in extra Municipal Institutions.

If, now, the Registrar-General's estimate of the population is too low, then both these death-rates are too high—not, however, by any considerable amount.

A comparison of the populations of the different districts, as estimated from the numbers of inhabited houses, and from the figures of the Registrar-General respectively, has two interests.\*

It enables us to observe the growth of the different districts, and to correct fallacious estimates of mortality.

The figures are, therefore, inserted here, along with the rates of mortality in 1897. If this table is compared with Table H in the Appendix, the difference in the rates calculated on the two populations is most marked in the following districts—viz., Central, Moston, Clayton.

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\* I am indebted to Mr. A. Lings, Mr. G. F. Tatton, and Mr. J. E. Balmer for the information which has enabled me to make the computation on the bases of inhabited houses.



TABLE 2.—ESTIMATED POPULATION FROM THE OVERSEERS' BOOKS, AND BY THE REGISTRAR-GENERAL'S METHOD, WITH BIRTH AND DEATH-RATES ON THE FORMER POPULATION.

STATISTICAL DIVISIONS	Population Estimated from Overseers' Books	Population calculated on the basis of increase during the 10 years 1881-1891	BIRTHS		DEATHS	
			Total	Rate per 1,000	Total	Rate per 1,000
City of Manchester .....	536,235	536,426	17,629	32·88	11,990	22·36
I. Manchester Township....	141,799	145,688	5,113	36·06	4,181	29·49
II. North Manchester .....	147,784	141,909	4,714	31·90	2,601	17·60
III. South Manchester.....	246,652	248,829	7,802	31·63	5,208	21·11
TOWNSHIPS						
I. { Ancoats.....	46,219	45,737	1,732	37·47	1,345	29·10
Central .....	33,039	36,211	1,018	30·81	1,030	31·18
St. George's .....	62,541	63,740	2,363	37·78	1,806	28·88
II.						
{ Cheetham .....	34,730	31,006	1,066	30·69	505	14·54
Crumpsall .....	8,601	9,556	190	22·09	106	12·32
Blackley .....	8,497	8,024	226	26·60	121	14·24
Harpurhey .....	13,400	11,881	470	35·07	223	16·64
Moston .....	8,294	6,581	229	27·61	120	14·47
Newton .....	36,149	37,063	1,065	29·46	739	20·44
Bradford .....	22,077	22,896	923	41·81	499	22·60
Beswick .....	10,941	10,788	400	36·56	187	17·09
Clayton .....	5,095	4,114	145	28·46	101	19·82
III.						
{ Ardwick .....	39,296	37,472	1,373	34·94	804	20·46
Openshaw.....	27,928	30,803	939	33·62	526	18·83
West Gorton .....	27,302	27,680	961	35·20	567	20·77
Rusholme and Kirk. ....	20,793	19,494	495	28·81	289	13·90
Chorlton-upon-Medlock	60,007	61,580	1,570	26·16	1,220	20·33
Hulme .....	71,326	71,800	2,464	34·55	1,802	25·26

NOTE.—This Table may be compared with the rates in Table H in the Appendix, such rates there being calculated on population estimated by Medical Officer of Health.

On referring to Table F, it will be seen that the death-rates for 1896 and 1897 are both under 23 per 1,000, a succession not observed in any two previous years, and, as it promises to continue in 1898, there is some reason to hope that influences are at work leading to a reduction of the mortality.

Nevertheless, the improvement does not keep pace with that holding throughout the country generally, as will be seen from the corrected comparative mortality figures—the figure for England and Wales being 1,000.

These are—For 1891-93..... 1,424  
 „ 1894 ... .. 1,354  
 „ 1895 ... .. 1,450  
 „ 1896 ... .. 1,457  
 „ 1897 ... .. 1,453

The corrected death-rates are still, however, lower than in Liverpool, Preston, and Salford, so that the causes raising the mortality in 1897 were in general operation, as will be further seen from the complete table.

TABLE 3.—RECORDED AND CORRECTED DEATH-RATES PER 1,000 PERSONS  
LIVING IN 33 GREAT TOWNS DURING THE YEAR 1897.

TOWNS in the order of their Corrected Average Death-rates	Standard Death-rate	Factor for correction for Sex and Age distribution	Recorded Death-rate, 1897	Corrected Death-rate, 1897	Compara- tive Mortality Figure, 1897
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5
England and Wales .....	19·15	1·0000	17·43	17·43	1,000
England and Wales less the 33 Towns .....	} 19·45	0·9845	16·52	16·26	933
33 Towns .....	17·71	1·0813	19·10	20·65	1,185
Croydon .....	18·37	1·0424	13·07	13·62	781
Brighton .....	18·94	1·0110	15·06	15·23	874
Portsmouth .....	18·73	1·0224	16·21	16·57	951
Cardiff .....	17·16	1·1159	14·94	16·67	956
West Ham .....	17·75	1·0788	15·66	16·89	969
Swansea .....	17·53	1·0924	15·82	17·28	991
Derby .....	17·36	1·1031	16·03	17·68	1,014
Bristol .....	18·33	1·0447	17·20	17·97	1,031
Norwich .....	19·99	0·9579	18·77	17·98	1,032
Halifax .....	17·20	1·1133	16·48	18·35	1,053
Plymouth .....	19·70	0·9720	19·04	18·51	1,062
Huddersfield .....	16·47	1·1627	16·40	19·07	1,094
Leicester .....	17·64	1·0855	17·66	19·17	1,100
London .....	17·97	1·0656	18·19	19·38	1,112
Hull .....	18·23	1·0504	18·56	19·50	1,119
Gateshead .....	17·83	1·0740	18·28	19·63	1,126
Bradford .....	16·73	1·1446	17·45	19·97	1,146
Birkenhead .....	17·42	1·0993	18·26	20·07	1,151
Nottingham .....	17·81	1·0752	18·78	20·19	1,158
Sunderland .....	18·25	1·0493	19·70	20·67	1,186
Newcastle .....	17·58	1·0892	19·09	20·79	1,193
Blackburn .....	17·05	1·1231	19·50	21·90	1,256
Oldham .....	16·72	1·1453	19·18	21·97	1,260
Leeds .....	17·28	1·1082	19·88	22·03	1,264
Burnley .....	16·67	1·1487	19·51	22·41	1,286
Wolverhampton .....	18·30	1·0464	22·05	23·07	1,324
Sheffield .....	17·22	1·1120	21·20	23·57	1,352
Birmingham .....	17·33	1·1050	21·59	23·86	1,369
Bolton .....	16·90	1·1331	21·97	24·89	1,428
Manchester .....	16·90	1·1331	22·35	25·33	1,453
Liverpool .....	17·44	1·0980	24·37	26·76	1,535
Preston .....	17·42	1·0993	24·36	26·78	1,536
Salford .....	17·03	1·1244	23·91	26·88	1,542



TABLE 4.—1897.—RECORDED AND CORRECTED DEATH-RATES

PER 1,000 PERSONS LIVING IN GROUPS OF CIVIL PARISHES.

Groups of Civil Parishes in the Sub-Districts of Manchester, arranged in order of their corrected Death-rates	* Standard Death- rate	† Factor for correction for Sex and Age Dis- tribution	Recorded Death- rate, 1897	‡ Corrected Death- rate, 1897	§ Compar- ative Mortality Figure
Cheetham and Crumpsall	17·91	1·0693	15·06	16·11	924
Blackley and Harpurhey	17·16	1·1157	17·28	19·28	1,106
Moston .....	17·72	1·0807	18·23	19·71	1,131
Ardwick, Openshaw, } West Gorton, and } Rusholme .....	16·81	1·1374	19·07	21·69	1,245
Newton Heath, Brad- } ford, Beswick, and } Kirkmanshulme ... }	17·08	1·1211	19·84	22·24	1,276
Chorlton-upon-Medlock.	16·29	1·1755	19·81	23·29	1,336
Clayton .....	17·71	1·0815	24·55	26·55	1,523
Hulme .....	16·93	1·1309	25·10	28·38	1,628
St. George's .....	16·89	1·1340	28·33	32·13	1,843
Ancoats .....	16·83	1·1381	29·41	33·47	1,920
Central .....	16·25	1·1782	28·44	33·51	1,923
England and Wales ...	19·15	1·0000	17·43	17·43	1,000

\* The standard death-rate signifies the death-rate at all ages calculated on the hypothesis that the rates at each of twelve age periods in each town were the same as in England and Wales during the ten years 1881-90, the death-rate at all ages in England and Wales during that period having been 19·15 per 1,000.

† The factor for correction  $\left\{ = \frac{19·15}{\text{Standard death-rate}} \right\}$  is the figure by which the recorded death-rate should be multiplied in order to correct for variations of sex and age distribution

‡ The corrected death-rate is the recorded death-rate multiplied by the factor for correction.

§ The comparative mortality figure represents the corrected death-rate in each group of civil parishes compared with the recorded death-rate at all ages in England and Wales in 1897 taken as 1,000.

Of the Manchester deaths, 20 per cent., or, according to the Registrar-General, 20·8 per cent., occurred in public institutions. This is only exceeded by London, Brighton, and Liverpool. Only in London, Manchester, and Liverpool can poverty be a chief cause of this large percentage. The deaths occurring in institutions are shown in the following table :—

TABLE 5.—POPULATIONS—DEATHS OF MANCHESTER RESIDENTS,  
1897, IN PUBLIC INSTITUTIONS.

Township	NAME OF INSTITUTION	Population, 1891	Deaths, 1897
ANCOATS .....	Ancoats Hospital .....	64	86
	Workhouse Casual Wards .....	167	6
	Royal Infirmary .....	260	287
	St. Mary's Hospital .....	27	11
	Lock Hospital .....	25	...
	Eye and Ear Hospital .....	7	1
CENTRAL .....	Alsop's Boys' Home.....	11	...
	St. Joseph's Girls' Home.....	17	...
	Chetham Hospital.....	100	...
	Mission Refuge (St. John's Parade) .....	8	...
	Consumption Hospital.....	...	...
	Children's Hospital (Gartside Street).....	...	...
ST. GEORGE'S ...	Girls' Home (Charter Street) .....	21	...
	Her Majesty's Prison .....	922	6
CHEETHAM ...	Boys' Refuge .....	185	...
	Girls' Friendly Society .....	18	..
	Clinical Hospital .....	36	95
CRUMPSALL ...	Manchester Workhouse .....	2,608	856
*	Prestwich Workhouse .....	305	115
	Manchester and Salford Reformatory .....	76	...
BLACKLEY .....	Litchford Hall .....	152	3
	Well's House Convalescent Home.....	10	...
	St. Mary's Home .....	...	1
MOSTON .....	St. Joseph's Home .....	34	...
	St. Bridget's Orphanage .....	32	...
NEWTON.....	Monsall Hospital .....	185	160
	Little Sisters of the Poor (Culcheth Hall) ...	107	7
CLAYTON .....	Clayton Smallpox Hospital .....	...	...
ARDWICK .....	Industrial School .....	203	...
	Nicholls Hospital .....	100	...
OPENSHAW .....	Crossley's Home .....	...	14
RUSHOLME.....	St. Joseph's Girls' School .....	150	3
	St. Mary's Home .....	28	...
	St. Joseph's Boys' School ..	413	2
	Royal Eye Hospital .....	59	1
	Little Sisters of the Poor (Plymouth Grove)...	182	26
	Casual Wards (All Saints) ..	21	1
CHORLTON-ON-MEDLOCK	Southern Hospital .....	23	36
	Cancer Hospital .....	19	16
	Maternity Home .....	11	12
	Home for Young Girls.....	18	...
	Rylands' Orphanage.....	17	...
	Church Army Labour Home .....	20	...
	Penitentiary .....	51	...
	Cavalry Barracks .....	404	...
HULME .....	Boys' Home (Chester Road) .....	20	...
	Loretto Convent .....	...	...
*	Withington Workhouse .....	1,375	577
OUTSIDE CITY.	Ashton-under-Lyne Workhouse .....	...	...
	Pendlebury Hospital .....	50	29
	Prestwich Lunatic Asylum .....	755	45
	Bowdon Consumption Hospital.....	...	6
TOTALS.....		9,296	2,402

\* Proportion only.



The inquest cases in 1897 were 6·6, or, according to the Registrar-General, 7·1 per cent. of all deaths.

If we add together inquest cases and uncertified deaths, we find the percentage (viz., 8·3) exceeded among the large towns only in London, Bristol, Leicester, Derby, Liverpool, Bolton, Hull, and Newcastle.

It is desirable that as low a proportion as possible of these deaths should be uncertified.

The lowest proportions are in Croydon, Derby, Bolton, and Oldham.

When, now, we come to analyse the mortality for the year, we may consider, first, that class of disease over which we have some measure of direct control, viz. : the zymotic diseases.

From *Smallpox* the mortality was nil.

From *Scarlet Fever* it was 0·23 per 1,000, which approaches the lowest point hitherto reached in Manchester. (Table F.)

From *Enteric Fever* it was 0·18 per 1,000, which again approaches the lowest point hitherto attained ; the only other years in which the death-rate fell below 0·20 having been 1894 and 1895.

From *Diphtheria* the death-rate was 0·08, which is about half the rate for 1896, itself the year of lowest recorded death-rate.

On the other hand, the death-rates from those diseases on which we can exert comparatively little influence—viz., Measles, Whooping Cough, and Diarrhœa—were high.

From *Measles* the rate was 1·17, being higher than in any year since 1889. Moreover, on reference to Table F, it will be seen that the prevalence of Measles has continued over three successive years.

From *Diarrhœa* the death rate was 1·74, the highest rate since 1893, and, like Measles, only part of a high prevalence extending over three successive years.

From *Whooping Cough* the death-rate was 0·56, as against an average of 0·70 for 25 years.

If we compare these figures with the rates for the 33 large towns we find that, while the death-rate from Diphtheria is considerably below the average, and that from Enteric Fever is nearly the average, the death-rate from Scarlet Fever is above the average, and the rates from Measles, Whooping Cough, and Diarrhœa are considerably in excess.

The position in which we stand for the year may be best seen by forming a table of gains and losses in the death-rate from various diseases per 1,000 persons living as compared with the average of the previous six years :—

*Gains in 1897.*

Scarlet Fever.....	0·05
Whooping Cough.....	0·09
Diphtheria.....	0·17
Enteric Fever .....	0·06
Influenza .....	0·09
Puerperal Fever .....	0·01
Rheumatic Fever.....	0·01
Premature Birth .....	0·01
Old Age.....	0·05
Brain and Nervous Diseases .....	0·40
Heart Diseases .....	0·01
Bronchitis .....	0·56
Pneumonia .....	0·30
Other Respiratory Diseases.....	0·13
Digestive Organs .....	0·04
Tubercular Disease other than Phthisis .....	0·04
Total .....	<u>2·02</u>

*Losses in 1897.*

Measles .....	0·48
Diarrhoea .....	0·61
Pyæmia .....	0·10
Cancer .....	0·11
Phthisis .....	0·05
Total .....	<u>1·26</u>
Balance of Gain .....	<u>0·76</u>

The actual balance of gain is 0·93, so that the greater part is contained in the above figures.

It will be seen that the greatest gain occurs under Respiratory Diseases, Brain Disease, and Diphtheria; the greatest losses under Measles, Diarrhoea, and Cancer.

In my last Report, a comparison was made for different groups of ages between the mortalities in Manchester, London, and England, and it was there shown that the chief excess of mortality in Manchester falls under Respiratory Disease, but that there is also a steady excess under Phthisis, Brain Failure, Diseases of the Circulation, and Diarrhoea.

The incidence of mortality as regards age and sex during the year is seen in Table 6.

TABLE 6.—ANNUAL RATES OF MORTALITY IN MANCHESTER IN THE YEAR 1897 AT TWELVE GROUPS OF AGES  
 AMONGST PERSONS, MALES AND FEMALES, COMPARED WITH THE AVERAGE RATE AT THOSE AGES IN MANCHESTER  
 1891-1896, AND ENGLAND AND WALES DURING THE DECENNium 1881-90.

	PERSONS			MALES			FEMALES		
	Manchester Average, 1891-1896	Manchester, 1897	England and Wales, 1881-90	Manchester Average, 1891-1896	Manchester, 1897	England and Wales, 1881-90	Manchester Average, 1891-1896	Manchester, 1897	England and Wales, 1881-90
All Ages ... ..	22.70	22.35	19.17	24.41	24.28	20.28	21.11	20.56	18.06
0— .....	77.93	81.18	56.77	83.45	87.72	61.59	72.54	74.79	51.95
5— .....	5.49	4.76	5.31	5.37	4.04	5.35	5.61	5.45	5.27
10— .....	2.87	2.61	3.04	2.99	3.03	2.96	2.74	2.20	3.11
15— .....	4.45	4.18	4.38	4.98	4.79	4.33	3.95	3.60	4.42
20— .....	5.51	4.92	5.64	6.00	5.79	5.73	5.07	4.15	5.54
25— .....	8.64	7.53	7.20	9.19	8.44	7.78	8.13	6.69	7.41
35— .....	16.08	14.21	11.51	18.45	15.36	12.41	13.82	13.12	10.61
45— .....	26.06	25.50	17.23	30.49	30.49	19.36	22.10	21.05	15.09
55— .....	48.87	46.65	31.57	54.42	54.57	34.69	44.38	40.26	28.45
65— .....	94.50	94.95	65.38	107.43	109.26	70.39	85.62	85.13	60.36
75— .....	203.85	205.98	138.88	228.61	224.68	147.14	189.16	194.89	130.62
85— .....	299.32	294.12	288.32	320.98	328.57	305.81	289.04	278.15	270.82



As regards age, we perceive that while the death-rate at ages 0-5 is considerably higher than in recent years, at succeeding age groups up to 65 the reverse is the case. The excess of mortality at age 0-5 we have already seen to be due to the epidemic prevalence of Measles and Diarrhoea. The diminution of mortality at higher ages is well marked up to the age of 45. After 65, there is an increase in the death-rate.

As regards sex, the male death-rate is seen to be 24·41, as compared with 21·11 for females. There is thus a great excess of mortality amongst males—an excess which is well marked from year to year.

When we analyse this excess according to ages, we find that it is conspicuous in infancy (age 0-5), and at every age group save one, viz., 5-10. It is particularly great at the ages 45-65, being much greater for those ages than in all England during the years 1881-90.

The exceptional preponderance of mortality in females at ages 5-10 is not confined to the year 1897, but is also observed in the average of the years 1891-96, though not so great as in that year. It is thus not accidental, but is the result of some specific influence.

The same thing is to be noted in the mortality for the country generally at ages 10-20 during the years 1881-90, and is especially marked at the ages 10-15.

On looking through the tables of deaths for successive years, however, we do not find the relation a constant one, either for successive years or in regard to any special class of disease.

All that we can infer is that girls of this age when subject to the same influences as boys, and enjoying perhaps less freedom to run about, do on the average die at a greater rate.

The death-rate at ages 0-5 is 81·18, as compared with 4·76 at the ages 5-10. The infant mortality is thus a very strong factor in the production of the death-rate, and requires to be scrutinised with especial care.

Taking the first year of life, we find the proportion of deaths under 1 year to 1,000 births to be 195. This is a high figure, though one which is exceeded by a number of other towns.

On referring to the rates of mortality in the first year of life from specific causes given in Table K, we find that the chief elements of the high mortality are Diarrhoea, Lung Diseases, and Wasting Diseases, largely from malnutrition. But Convulsions, Tubercular Disease, Measles, and Whooping Cough also play an important part.



Table E enables us to follow more closely the incidence of different causes of death.

Thus in 1897 the greatest mortality in the first three months of life is experienced from Premature Birth, Wasting Diseases, Unclassified Diseases, Diarrhoea, Lung Disease, and Convulsions. The number of deaths from this last cause is low in 1897, and, as has been before stated, there is reason to connect this with an improvement in the conditions of infant feeding.

In the next three months the most conspicuous causes of death are Diarrhoea—which now reaches its maximum—Lung Diseases, and Wasting Disease.

At the age period 6–12 months the Diarrhoeal mortality is still very high, Lung Disease is undiminished, and the mortality from Whooping Cough reaches its maximum. The deaths from Measles have now become very numerous.

In the second year of life the chief cause of death is Measles, which attains its maximum. Lung Disease still exacts a heavy though diminishing mortality, as is also the case with Whooping Cough and Diarrhoea.

In the third year of life, Measles and Lung Disease exact the heaviest mortalities, though Scarlet Fever now reaches its maximum.

In the fourth and fifth years, in 1897, Measles and Lung Disease still preponderate.

One element in the infantile mortality calls for special observation, viz., the death-rate of illegitimate children. The percentage of illegitimacy in 1897 is 4·14, and the mortality is precisely double that of legitimate infants.

When, now, we pass to higher groups of ages, we find that at school ages 5–15 the highest mortality is exacted by Tubercular Disease; next in order being Lung Disease, Brain and Heart Disease, followed by the zymotics—Scarlet Fever, Measles, Enteric Fever, and Diphtheria.

At ages 15–25, Tubercular Disease is again the most prominent cause of death—followed by Lung Disease, Heart Disease, Brain Disease, and Enteric Fever.

At ages 25–45 the mortality from Tubercular Disease is 3·72 as against 1·62 per 1,000 from Lung Disease and 1·15 from Heart Disease. The mortality from Brain Disease has increased, as has also the death-rate from Digestive and Urinary Diseases. That from Enteric Fever is still well marked.

From 45 to 65 years the death-rate from Tubercular Disease has again increased to 4·43 per 1,000, but is now exceeded by the mortalities from Lung Disease and Heart Disease, which respectively amount to 7·16 and 5·72 per 1,000. The mortality from Brain Disease is now 4·07 per 1,000.

Over 65 years the chief special causes of death are Diseases of the Lung, Heart, and Brain. The death-rate from Tubercular Disease is now diminished, while that from Digestive troubles, from Urinary Diseases, and from Diarrhoea have markedly increased.

### COMPARISON OF THE DIFFERENT DIVISIONS OF THE CITY.

It is of unfailing interest and importance to compare the death-rates in the different divisions of the City.

The Manchester Township lies in the centre of the inhabited areas of Manchester and Salford, has a higher density of population than the other divisions, possesses no outlying rural portion, gathers into it much of the inferior elements of society, and is, moreover, structurally under worse conditions than the newer portions of the City.

The Southern division of the City, again, is much more crowded than the Northern division, the number of persons to an acre being 63 in the former as against 20 in the latter. Throughout a great portion of the populous district of Hulme the houses are crowded together behind so as to exclude a sufficiency of light and air, while the narrow passages, even when open at both ends, do not permit of much movement along the backs of the houses. It is possible that with the great impulse which the City has recently received towards increased growth, the number of persons to a dwelling in this district has increased. The mortality in Hulme, with 151 persons to an acre, stood in 1897 at the high figure of 25·1 per 1,000.

Nevertheless, the total mortality of the Southern division in 1897 approached more nearly to the lower mortality of the Northern division than to that of the Manchester Township.

If we look now at Table J in the Appendix, we find that the percentage of illegitimacy is higher in the Manchester Township than in South Manchester, while it is more than double the percentage in North Manchester. This must be taken to imply a difference in the character of the populations.

Further information may be gathered from an examination of the death-rates.

The total infantile mortality is seen from Table K to be 221·79 in the Manchester Township, as compared with 193·41 in South Manchester and 167·16 in North Manchester.



From the same table we find that the infantile mortality in the Manchester Township considerably exceeded that in South Manchester from Diarrhoea, from Lung Diseases, and from Wasting Disease. All these conditions may be taken to imply a greater disregard of the conditions necessary for the welfare of infants, especially as regards cleanliness and infant feeding. There was also a considerable excess for the Manchester Township over South Manchester in the mortality of children "found dead in bed," which probably argues excess both of carelessness and intemperance.

On the other hand, the infantile death-rate in the Southern Division is higher from Tubercular Disease, a relation which is constant, and which is difficult to account for, at all events on the score of feeding.

The death-rate from Whooping Cough is also in excess in South Manchester. This is, however, not usual.

The infantile death-rate in South Manchester exceeds that in North Manchester from almost every cause named in the table. The excess is particularly marked in respect of Measles, Whooping Cough, Tubercular Diseases, Convulsions, and "found dead in bed." The first two named are not invariable excesses. The last three may be taken to indicate a decidedly greater decree of carelessness as regards children, both in feeding and in otherwise looking after them.

There is also a decided excess in South Manchester of the infantile mortalities from Diarrhoea and Wasting Disease, and a slight excess under Lung Disease.

Table L shows for a large number of diseases the death-rates in the respective divisions of the City taken on the whole population of the respective divisions.

We thus see that the death-rates for 1897 are highest in North Manchester from Enteric Fever, Diphtheria, and Scarlet Fever. But neither are the mortalities high nor the differences great.

On referring to the table it will be seen that in respect of Phthisis the difference is very great indeed, the death-rate from this cause in the Manchester Township being 3.35, in South Manchester 1.83, and in North Manchester 1.38. Thus the last mortality is not half that of the first. The death-rate from Phthisis in the centre of the City we have previously seen occasion to connect with the crowding in that part of Manchester, and with the large number of lodging-houses which it contains.

The same differences are observed in regard of Pneumonia, Bronchitis, other Respiratory Disease, Heart Disease, and the groups Brain and other Diseases.

I have in a previous report commented on these differences, and pointed out the connection between the named groups enumerated. Taking the Respiratory Diseases in one group, we have these death-rates:—

MANCHESTER TOWNSHIP	NORTH MANCHESTER	SOUTH MANCHESTER
5·96	3·89	4·01

Differences of like nature are also observed under Digestive Organs and Urinary Organs, Old Age, Premature Birth, and Cancer.

So unvarying, practically, are the figures that it might be supposed that some error existed in regard to the populations. If, however, such an error exists, it is of a nature rather to exaggerate these differences, and not to reduce them.

Table N permits us to institute a comparison for different age groups of the mortalities in the divisions of the City.

From that table we perceive that at every age group the death-rate of the Manchester Township exceeds that of South Manchester, and the death-rate of South Manchester exceeds that of North Manchester. The differences are, however, greater at some age groups than at others. They are especially marked, however, at the ages 0-5, and again at the ages 25-45 and 45-65. On referring to the Table N in the Reports for 1895 and 1896 it will be seen that these are constant relations, and that the conditions in the Manchester Township are thus certainly disastrous to life, even if a portion of the excessive adult mortality may be assigned to non-preventable causes. It is of constant interest, moreover, to see on what organs of the body this great excess of disease in the Manchester Township falls. We have already seen that Diarrhœa is much more prevalent in the Manchester Township than in South Manchester, and in South Manchester than in North Manchester. This is no doubt to a large extent connected with different degrees of carefulness in the tendance of children.

The death-rate from Tubercular Disease at ages 0-5 is highest in South Manchester, but with this exception the usual course is followed.

At ages 5-15 the death-rate from Tubercular Disease in the Manchester Township is considerably in excess of that in South Manchester, and is almost double that in North Manchester. The discrepancy is nearly as great at ages 15-25. At ages 25-45 the mortalities are respectively 6·08, 2·90, and 2·71; and at ages 45-65 they are 7·13, 4·11, and 1·90, so that at the last ages the death-rate from Tubercular Disease is nearly four times as great in the centre of the City as in the Northern Division, while at ages exceeding 65 years the death-rate is more than four times greater from Tubercular Disease in Manchester Township than it is in North Manchester.

These remarkable differences are due to a number of concurrent causes—insanitary conditions, intemperance, and, above all, crowding in badly ventilated lodging-houses.

The same differences are seen in respect of other diseases.



Especially are these great disparities noticeable in the case of Lung Disease. At ages 0-5 the death-rate in the Manchester Township is 20·48, as against 14·71 in South Manchester and 14·38 in North Manchester. The same differences are observable at ages 5-15 and ages 15-25. At ages 25-45 the death-rate is about twice that in South Manchester, which is, however, somewhat lower than the rate in North Manchester. At higher ages a great preponderance prevails in the mortality from Lung Disease in the Township over South Manchester, and in South Manchester over North Manchester. It is the same with Heart and Brain Diseases at ages 25 to 65. The diseases, then, in which the graduation is most marked are Phthisis and Diseases of the Lungs.

Now this is certainly remarkable if we consider the great number of chemical works in Newton Heath, Clayton, and Openshaw, and calls for closer inquiry.

If, now, we turn to Table H, which shows the birth-rates and death-rates in the different districts, we find that the birth-rates are exceptionally high in St. George's, Ancoats, Harpurhey, Bradford, Beswick, Clayton, Ardwick, Moston, West Gorton, and Hulme.

The rates calculated from the estimate of populations made by the Medical Officer of Health from the Overseers' books would, in the above list, substitute Openshaw for Clayton, and exclude Moston.

With this substitution, the observation made in the Report for 1896 holds good that the birth-rate is high over a continuous industrial population extending from Rochdale Road to Ardwick.

There is, however, no correspondence between high birth-rates and high death-rates. Where such correspondence prevails, it is due to insanitary conditions.

The effect of calculating the populations on the basis of inhabited houses is seen to be that the birth and death rates are considerably modified.

Amongst the death-rates lowered considerably are those of Cheetham, Blackley, Harpurhey, Moston, and Clayton in North Manchester, and of Ardwick and Rusholme in South Manchester. Amongst the death-rates increased are those of Ancoats, Central, St. George's, Crumpsall, Newton, Bradford, Openshaw, West Gorton, Chorlton-on-Medlock, and Hulme. The most considerable change is in Clayton.

Taking into account this redistribution, the highest death-rates in North Manchester are in Bradford and Newton Heath; in South Manchester in Hulme, and then with a large interval in West Gorton, Ardwick, and Chorlton-on-Medlock.

This is precisely the same order as in 1894, and it is not altered—with the exception of Clayton—by the rearrangement of the population.

The influence of poverty in raising the death-rate is a very important one. It is shown in the following table :—

TABLE 7—1897.—DEATH RATES\* IN THE HOMES OF THE PEOPLE,  
IN WORKHOUSES, AND IN HOSPITALS FOR THE VARIOUS DIVISIONS OF  
THE CITY.

STATISTICAL DIVISIONS	Estimated Popula- tions	Death-rate per 1,000 of persons dying in their own homes	Death-rate per 1,000 of persons dying in Work- houses	Death-rate per 1,000 of persons dying in Hospitals	Total death-rate per 1,000
City of Manchester ...	† 536,426	17·87	2·89	1·59	22·35
I. Manchester Township	145,688	20·35	5·86	2·49	28·70
II. Northern Districts ...	141,909	16·13	0·82	1·37	18·33
III. Southern Districts ...	248,829	17·42	2·32	1·19	20·93
I. { Ancoats .....	45,737	22·50	4·50	2·41	29·41
{ Central .....	36,211	18·70	7·10	2·65	28·44
{ St. George's .....	63,740	19·75	6·13	2·45	28·33
II. { Cheetham .....	31,006	13·38	1·19	1·71	16·29
{ Crumpsall .....	9,556	9·10	1·26	0·73	11·09
{ Blackley .....	8,024	14·08	...	1·00	15·08
{ Harpurhey .....	11,881	17·42	0·42	0·93	18·77
{ Moston .....	6,581	16·71	0·61	0·91	18·23
{ Newton Heath .....	37,063	18·00	0·67	1·27	19·94
{ Bradford .....	22,896	18·78	1·09	1·92	21·79
{ Beswick .....	10,788	15·48	0·65	1·20	17·33
{ Clayton .....	4,114	22·61	0·49	1·46	24·55
III. { Ardwick .....	37,472	18·60	1·52	1·33	21·46
{ Openshaw .....	30,803	14·67	1·23	1·17	17·08
{ West Gorton .....	27,680	17·96	1·70	0·83	20·48
{ Rusholme and Kirk.	19,494	13·39	0·67	0·77	14·83
{ Chorlton-on-Medlock	61,580	15·57	3·00	1·23	19·81
{ Hulme .....	71,800	20·45	3·30	1·35	25·10

\* In this table, *every death* occurring in a Public Institution has been referred to the District from which the patient originally came.

† Population estimated to middle of 1897.



From this table it will be seen that the highest death-rates in the Work-houses occurred in persons from these districts in the order named : Central, St. George's, Ancoats, Hulme, and Chorlton-upon-Medlock.

When the death-rates occurring in institutions are excluded, and the mortalities occurring in the home alone are considered, the districts occur in this order : Ancoats, Hulme, St. George's, Central, Bradford, Ardwick, Newton Heath, and West Gorton.

From the tables given in the Report for 1896, it was shown that the excess in adult mortality in Manchester as compared with London, and with England and Wales generally, was chiefly in respect of Lung Diseases, though it was also marked in respect of Phthisis, Brain Failure, and Diseases of the Circulation. We have seen, on comparing the different districts of the City, that there is a conspicuous excess in the Manchester Township over the Southern Division in respect of Phthisis and Lung Disease, and in the Southern Division over the Northern Division in regard to the same diseases.

I have, therefore, considered it desirable to trace out year by year the mortalities from these diseases in the different districts, with a view, if possible, to ascertain whether we can exclude any particular supposed set of causes. If the excess in the death-rate from these special causes lies in the districts in which manufacturing industries are giving off effluvia of a noxious character, then we must direct our energies chiefly to dealing with such effluvia. If, on the other hand, it proves by any possibility that we can exclude this cause as a chief one, we must endeavour to get closer to the essential causes of fatality in the City, and endeavour to remove them. The death-rates alluded to, calculated on populations estimated after the method of the Registrar-General, are as follows : (See Table 8.)

From these figures it would seem that we cannot off-hand exclude chemical effluvia as an influence in the production of Respiratory Disease. On the other hand, equally high or higher death-rates are experienced in districts such as Hulme, in which these effluvia should exert much less effect. We may safely conclude that chemical effluvia are not the chief cause of the high respiratory mortality, and that the principal causes may be looked for nearer home



TABLE 8.—AVERAGE ANNUAL RATES OF MORTALITY FROM CERTAIN  
COMPARED

STATISTICAL DIVISIONS	Scarlet Fever		Enteric Fever		Phthisis	
	1891-7	1897	1891-7	1897	1891-7	1897
City of Manchester.....	0·27	0·23	0·23	0·18	2·08	2·12
I. Manchester Township.....	0·30	0·27	0·24	0·17	3·11	3·35
II. North Manchester .....	0·28	0·29	0·21	0·20	1·29	1·38
III. South Manchester .....	0·25	0·17	0·23	0·17	1·88	1·83
I. { Ancoats .....	0·29	0·37	0·24	0·17	2·63	2·51
Central .....	0·31	0·30	0·33	0·19	3·52	3·53
St. George's .....	0·31	0·19	0·19	0·16	3·23	3·84
II. { Cheetham .....	0·20	0·19	0·11	...	1·22	1·29
Crumpsall .....	0·20	0·21	0·13	...	1·03	1·15
Blackley .....	0·22	0·12	0·19	0·37	1·03	0·75
Harpurhey .....	0·29	0·17	0·21	0·17	1·14	1·77
Moston .....	0·24	...	0·24	0·46	0·99	0·91
Newton .....	0·32	0·16	0·28	0·30	1·55	1·75
Bradford .....	0·34	0·83	0·26	0·31	1·33	1·22
Beswick.....	0·37	0·28	0·25	0·19	1·27	1·39
Clayton .....	0·23	0·49	0·15	...	1·26	0·97
III. { Ardwick.....	0·32	0·27	0·21	0·16	1·73	1·47
Openshaw.....	0·23	0·23	0·27	0·29	1·16	0·81
West Gorton.....	0·25	0·22	0·31	0·14	1·70	1·19
Rusholme and Kirk. ....	0·15	0·10	0·18	0·21	1·09	0·97
Chorlton-upon-Medlock ...	0·22	0·13	0·17	0·15	2·04	2·08
Hulme .....	0·28	0·14	0·26	0·14	2·36	2·72

CAUSES IN DIVISIONS AND DISTRICTS, FOR THE 7 YEARS 1891-7  
WITH 1897.

Nervous Diseases other than Convulsions		Circulatory System		Bronchitis		Pneumonia		Other Respiratory Diseases	
1891-7	1897	1891-7	1897	1891-7	1897	1891-7	1897	1891-7	1897
1.75	1.63	1.75	1.74	2.52	2.05	2.43	2.17	0.40	0.29
1.92	1.70	2.24	2.16	3.45	2.70	3.33	2.88	0.47	0.38
1.63	1.62	1.37	1.44	1.93	1.84	1.97	1.89	0.35	0.16
1.71	1.58	1.66	1.66	2.28	1.79	2.14	1.92	0.39	0.30
2.07	1.82	2.14	1.92	4.24	3.02	3.43	2.69	0.53	0.57
1.99	1.85	2.38	2.04	3.21	2.29	3.09	2.98	0.41	0.25
1.77	1.52	2.22	2.38	3.03	2.70	3.39	2.95	0.46	0.31
1.58	1.93	1.32	1.64	1.39	1.23	1.29	1.35	0.27	0.06
1.49	1.57	1.35	0.94	1.20	1.15	1.08	0.52	0.23	0.21
2.10	1.87	1.82	1.62	1.78	1.12	1.72	1.25	0.77	0.25
1.54	1.27	1.50	1.35	1.57	1.01	2.13	1.77	0.43	0.08
1.65	1.67	1.62	1.52	1.07	1.52	1.65	2.58	0.24	...
1.79	1.62	1.48	1.83	2.04	2.05	2.11	2.46	0.35	0.27
1.53	1.31	1.09	0.92	3.05	3.10	2.63	2.31	0.40	0.13
1.47	1.86	1.34	1.30	2.11	1.58	2.65	1.39	0.29	0.09
1.37	1.21	0.95	0.49	2.55	4.13	2.81	3.40	0.30	0.49
1.48	1.60	1.52	1.68	2.35	1.76	2.09	2.13	0.39	0.27
1.37	0.84	1.48	1.07	2.25	1.79	2.11	1.69	0.39	0.16
1.46	1.41	1.24	1.12	1.88	1.63	2.43	1.99	0.29	0.25
1.30	1.38	1.52	2.10	1.37	1.08	1.12	0.87	0.25	0.36
1.83	1.67	1.72	1.85	2.16	1.74	1.94	1.67	0.43	0.39
2.06	1.93	1.94	1.84	2.74	2.10	2.49	2.37	0.42	0.31

## INFECTIOUS DISEASES.

The diseases included in the Manchester Notification Act of 1881 are as follows: Smallpox, Scarlet Fever, Diphtheria, Typhus Fever, Enteric or Typhoid Fever, Relapsing Fever, Puerperal Fever, and Asiatic Cholera. Membranous Croup was added in 1892. The following cases were notified in 1897 and six previous years:—

	1891	1892	1893	1894	1895	1896	1897
Smallpox.....	2	118	607	282	51	1	0
Scarlet Fever .....	1,138	1,671	2,031	2,230	2,302	2,389	1,790
Diphtheria .....	456	497	622	512	402	239	150
Membranous Croup}							
Typhus Fever.....	16	6	1	...	...	1	2
Enteric Fever.....	761	610	618	460	493	513	503
Relapsing Fever.....	4	...	...	...	...	...	...
Puerperal Fever.....	55	92	93	51	33	25	49
	2,432	2,994	3,972	3,535	3,281	3,168	2,494

The number of deaths for seven years from the more common diseases is shown in the following table:—

From	1891	1892	1893	1894	1895	1896	1897
Measles ... ..	220	369	293	222	505	567	628
Scarlet Fever .....	114	139	140	116	173	198	124
Diphtheria .....	122	91	122	102	72	54	29
Membranous Croup..	6	39	60	47	41	29	17
Enteric Fever.....	189	124	127	91	95	118	95
Smallpox .....	0	2	49	21	2	0	0
Influenza .....	347	140	120	45	194	53	107
Whooping Cough ...	518	368	240	286	250	359	299
	1,516	1,272	1,151	930	1,332	1,378	1,299



## ON SCARLET FEVER.

Scarlet Fever is probably the most important disease with which the administrative departments of sanitary authorities have to deal, whether as regards the number of cases, the mortality, or the injury to health which remains to mark the occurrence of an attack. It is, moreover, always with us. Any indications, then, which we may obtain from our statistics or from our observations which will guide us in the better understanding of its habits must be regarded as of consequence. In previous reports we have considered especially the phenomenon of return cases of Scarlet Fever, its incidence on schools, its connection with milk supplies, and its relation to pollution of the soil. As regards return cases of Scarlet Fever, the policy has been pursued of isolating cases before discharge in separate convalescent wards. Before removal to these wards they are inuncted with carbolic oil, an operation which is repeated every two days, after a bath. Every day the nose, throat, mouth, and ears are washed out with an antiseptic solution.

During isolation in convalescent wards, moreover, the children are encouraged to run about as much as possible. This procedure—viz., isolation and special hygienic arrangements—was first adopted in the case only of patients who were not suffering from any discharge. Subsequently it was extended to all cases. But, in the last months of the year, there was a partial interruption of the precautions considered necessary on account of the rapid increase in the disease.

Nevertheless, it would appear as if a marked effect had been produced on the occurrence of these cases, and that in proportion to the completeness of the treatment indicated before discharge.

The effects of schools in spreading Scarlet Fever was considered last year. The considerations there given have been extended. So far as these two years go, they tend to show that the spread of Scarlet Fever in schools is slow ; that it tends to hang about particular departments of the school ; and that, under ordinary circumstances, the effects produced by the schools in the spread of this disease are not commensurate with those which they produce in the case of Measles.

Another question which has come under consideration has been the effect of season on the extension of the disease. In the Annual Report for 1895 were given curves showing the seasonal fluctuations of deaths from Diarrhœa, and of cases of Scarlet Fever and Enteric Fever. The seasonal curve of Scarlet Fever ascends in a somewhat abrupt manner every autumn, and reaches a maximum from the 39th to the 44th week. The summit is preceded by that of the curve of deaths from Diarrhœa, and followed by that of the curve of cases of Enteric Fever.

Now there are reasons for connecting the curves of Diarrhœa and Enteric Fever with bacterial growth occurring in the soil, and it is reasonable to suppose that the same may be the case with Scarlet Fever ; or we may make the more limited supposition that changes due to season occur in the excreta of Scarlet Fever as well as in those of the other diseases.

It may be useful to inquire what information we can derive from statistics in regard to notifiable infectious diseases, taking Scarlet Fever as a type.

In the first place, the Local Government Board issue a collectanea of the weekly cases of notifiable disease reported in a very large number of towns. These are classified in districts, and it is thus possible at a glance to see whether any infectious disease is spreading, and whether it threatens to invade our own district. This publication is sent every week to each of the authorities contributing to the collection. The usefulness of such a work in warning local authorities against the approach of any particular disease, or against its threatened extension, is very evident, and Dr. Tatham has the credit of having started the collection and distribution of such particulars before the Local Government Board took up the work.

From the notification forms we learn the age, sex, and address of each case notified, and the subsequent enquiries of the sanitary inspectors make us acquainted with a number of other particulars, such as the history of infection, the school attended, and so forth.

From these data we can in the first place construct seasonal curves, showing the number of cases reported week by week. When such curves are made for a number of years there become manifest, besides the annual wave of the disease in September, October, and November, large waves having a duration of five or six years, and with extended observations signs present themselves of still larger waves, having a long period.

In the report for 1896, it was pointed out that the annual wave for that year showed signs of instability, and that a fall might be expected in the quinquennial wave. This has occurred as anticipated.

It is by no means a matter of pure theoretic interest to trace these fluctuations, since the ascent of the quinquennial wave should be the signal for more strenuous defensive measures.

The cyclic waves mentioned are to some extent obscured by the steady fall which has taken place in the deaths, and in the number of cases, in recent times.

Taking the figures for England and Wales, the number of deaths per million living in periods of five years since 1861 have been 982, 960, 759, 680, 436, 241. Much of this fall must be ascribed to administrative



activity. Dr. Whitelegge, however, is of opinion that the fall is partly due to a change in type, and that we may anticipate a reversion to a more severe form of the disease. This anticipation may, under favourable conditions as regards prosperity, not be fulfilled, since the effects produced by administrative measures, and particularly by isolation in hospital, will react on the type of the disease.

If, now, we take the number of cases of Scarlet Fever notified at different ages, we find that the number increases up to the 5th year of age, when it attains a maximum. (See table at the end of this Section.)

These figures take precisely the same course as the age figures for London in 1895 and 1896 for males and females respectively.

The same table shows that, in Manchester, the number of deaths from Scarlet Fever attains a maximum, not in the 5th, but in the 4th year of life.

The deaths per 100,000 living at the respective ages is also greatest, for Manchester, in the 4th year of life.

The number of deaths in London in 1895 was highest both for males and females, as was also the death-rate per 100,000 living, in the 3rd year of life; in 1896 it was highest for males in the 4th and for females in the 3rd year of life. It would be interesting to know whether this has any relation to an earlier school attendance in London than in Manchester.

When, now, we take the percentage of deaths to the total number attacked, we find that this is greatest in the first year of life, and steadily diminishes year by year until we reach the 9th year, when it becomes stationary, beginning to rise again after the 10th year. The case mortality, or "the fatality," is as high as 22 per cent. in the first year of life, and as low as 2 per cent. in the 8th to the 10th years.

Now Scarlet Fever does not usually attack the first year of life, to commence with, when a family is invaded, nor does it readily do so even upon exposure. Still, on prolonged exposure, even infants contract the disease. Similarly, we can see from the figures that children between 1 and 2 years of age do not usually first contract the disease, nor perhaps so readily as older children. It is about the school period, or perhaps somewhat earlier, that the numbers rapidly increase. In the third year of life the number is already considerable of children who have not begun to attend school.

Recalling, then, the high fatality of the disease up to the age of four, we can see how important it is to ward off an attack from the younger children, an object which in poor households can only be achieved by isolation in hospital at the earliest possible date.

The London figures, both for males and females, are in this respect precisely similar.



Effect of Sex,

Dr. Shirley Murphy has worked out the figures for males and females respectively, and he finds that for the years 1892-95 on a total of 48,604 males the fatality was 4·7 per cent. as compared with 4·2 per cent. on a total of 53,587 females suffering from Scarlet Fever. The disease is more fatal, therefore, to male children.

Seasonal influence on fatality,

Working still with the same large figures, he finds that the fatality declines from 5·81 per cent. in January, month by month, to October, when it is 3·31 per cent., after which it begins again to ascend. To the gradual declension mentioned above, August forms an exception, due, as he surmises, to the greater proportional infection of infants (who have a high fatality) when the school children are home for their holidays. He finds, also, on correcting the mortality for age and sex, that but little difference is made in the result, and he infers, therefore, that there is a seasonal variation in the type of the disease.

Influence of the Schools in spreading the disease.

When a curve is constructed showing week by week the number of notified cases, such as is given in the Report on the Health of Manchester for 1895, it is found that a drop occurs corresponding to the summer holidays. This is manifest both in the London and Manchester curves, although in the latter of very short duration. It is specially striking for Manchester at the commencement of the holidays. The extent and duration of the drop are very clearly shown about the 30th week on the curves in the 1895 Report, and anyone can trace what occurs.

Now in order to determine precisely what the drop means, Dr. Shirley Murphy constructed separate curves for children up to the age of 3, from 3 to 13, and at ages 13 and upwards. Take first 1895. The summer holiday of the London School Board began in 1895 on July 25th, or in the latter part of the 30th week, and the schools re-opened on Monday, August 26th, at the beginning of the 35th week. The curve shows a fall in the number of cases notified in the 31st week, and an increase in the 36th week. If the number of cases notified in the four weeks which would be most subject to the influence of the holidays (*i.e.*, the 32nd to the 35th) be compared with the number of cases notified in the four preceding and four subsequent weeks, the following results are obtained :—

1895	Increase or Decrease per cent.			1896	Increase or Decrease per cent.		
	0-3	3-	13 and upwards		0-3	3-	13 and upwards
Four weeks—				Four weeks—			
28th to 31st ...	—	—	—	28th to 31st ...	—	—	—
32nd to 35th...	+ 7·7	— 22·0	— 18·6	32nd to 35th...	+ 26·5	— 2·9	+ 18·1
36th to 39th...	— 9·1	+ 40·0	+ 31·5	36th to 39th...	+ 0·6	+ 21·3	— 25·6

Thus in both years a marked decrease, though a varying one, takes place in the second period, among children at school age, at the period influenced by holidays.

The influence of aggregation in school is, however, susceptible of treatment in other ways. What the above investigation goes to show is a steady influence, intermitted by the closure of the school.

Dr. Whitelegge, from investigation of a large number of cases occurring in Nottingham, found that there was a diminution of cases occurring on Wednesday, corresponding to the absence of children from school on Sunday.

The subject is certainly one of importance, provided the precise nature of the influence of the school in spreading this disease is ascertained, and I have, therefore, attacked the problem in a somewhat different manner. Pursuing the same plan as was adopted last year, I have recorded for each school the date of attack, sex and age of each case attacked, omitting those school children whose illness could be clearly traced to contact with known cases of the disease outside school. This is not strictly fair to those who argue for the influence of contact at school. On the other hand, as all cases attending school, and not otherwise traced, are credited to the school, the influence of the school can scarcely be said to be underestimated when we consider that not a few of the cases probably contract their illness outside the school. However, the manner in which the disease ramifies in a school makes these points of little consequence.

Premising that no school influence is inferred if the cases are separated, in the same department, by more than two months in time, nor if a link fails to be established in some one department of the school, it may be stated that the records bring 156 schools into relation with scarlet fever, but of these only a few show clear evidence of the propagation of the disease in school. In some of these, however, not only is the phenomenon marked, but the manner of it is, even from the statistics, very apparent.

41 Schools had only one untraced case.

24 „ two cases.

20 „ three.

21 „ four.

11 „ five.

10 „ six.

5 „ seven.

3 „ eight.

21 „ nine and upwards.

In considering these more closely, the infants' department will be marked X, junior girls —, junior boys O, mixed department =, and \* will mark overlooked cases. In each case the sex, age, and date of eruption will be given.

Rejecting the schools which do not fulfil the elementary criteria applied, there remain these—

I. Large School, 5 departments, 9 cases. Doubtful if any influence can be traced.

II. School, 3 departments: infants, junior boys, and girls—

Date of Eruption.	Sex.	Age.	Date of Eruption.	Sex.	Age.
5 I.	f	6 X	29 IX.	f	12 —
7 I.	f	10 —	1 X.	f	8 —
29 VIII.	f	12 —	29 IX.	f	6 X
8 IX.	f	10 —	4 X.	f	6 X
23 IX.	f	11 —	2 X.	f	9 —
24 IX.	f	9 —	2 X.	f	6 X
25 IX.	m	6 X	4 X.	f	7 —
25 IX.	f	10 —	6 X.	m	6 X
24 IX.	m	7 O	7 X.	f	7 —
25 IX.	f	11 —	25 IX.	f	11 * —
27 IX.	m	15 O Pupil T.	18 X.	f	10 —
27 IX.	f	11 —	21 X.	f	6 X
15 IX.	f	12 * —	29 IX.	f	11 * —
28 IX.	m	6 X	28 X.	m	12 O
28 IX.	f	8 —	7 XI.	f	7 X
28 IX.	m	8 O	8 XI.	f	9 —
28 IX.	m	8 O	16 XI.	f	5 X

This school is discussed in the letterpress.

III. School, 2 departments—

Date.	Sex.	Age.	Date.	Sex.	Age.
4 I.	f	8 —	Holidays from 23 VII.		School in very
11 VIII.	f	8 —	to 23 VIII.		bad condition.
16 VIII.	f	4 X			Closets bad.
7 IX.	m	7 O	9 X.	m	8 O
1 IX.	m	5 * X	28 XII.	f	10 —
25 IX.	m	10 O			

No clear evidence of propagation of Scarlet Fever.

IV. School, same character as above.

V. Very large School—infants and junior boys and girls. Nine cases, but very doubtful, as above.

VI. Large School, 3 departments—

Date of Eruption.	Sex.	Age.	Date of Eruption.	Sex.	Age.
11 I.	f	4 X	24 VIII.	f	12 —
27 I.	f	6 X	24 XII.	m	5 X
9 IV.	f	3 X	24 XII.	m	7 X
27 VII.	f	4 X	24 XII.	m	6 X
16 VIII.	m	12 O			

Probably the infants' department was invaded towards the end of the year.



With reference to School II., Inspector Hyslop has prepared for me a sketch showing the position of each scholar when attacked, and a detailed account of the accommodation, floor space, arrangement of windows, playgrounds, closets, &c.

Taking this in conjunction with the dates of attack given above, we find that the girls and infants have a common playground. The disease starts amongst the girls, and, in spite of the fact that the girls and infants have common closets, remains nearly a month in the girls' department before it appears among the infants. It then continues to ramify slowly amongst the scholars in both departments up to the middle of November. On consulting the rough draught giving the position of the scholars, it will be seen that there is a tendency for the disease to attach itself to particular parts of the classroom.

Now although the girls and infants have the same playground, the girls' class-rooms being upstairs, the schools are practically separated, except for the playground and closets. The boys, who have a separate playground, remain practically entirely exempt, although there is only a wall between them and the girls and infants.

The closets are in a bad condition, being pail-closets, with wet ground under them.

In former reports I have given reasons for connecting the propagation of Scarlet Fever with defective closets, of which pail-closets may be regarded as intrinsically most dangerous.

It is possible, and there is indeed some degree of probability, that the disease was communicated in or about the closets to the infants' department, although there was also a persistence and low degree of propagation in the class-rooms.

The condition of the class-rooms thus wants consideration. These are ventilated entirely by windows and fireplace.

There is more than the allowance of cubic space and floor space in the boys' department, about the regulation amount in the infants' department, and considerably less in the girls' department.

We may, therefore, look with suspicion on the amount of accommodation provided for the girls in connection with the inception of the outbreak.

To sum up the suggestions derived from this school, especially if we consider that, with one exception, it suffered much the heaviest incidence of all schools from Scarlet Fever in 1897, we find that the disease is tenacious, once established, but spreads slowly and, even under favourable conditions, not readily; it may hang about particular departments of the school, and entirely spare adjoining departments.

The manner in which it commenced in this school shows that this is not due to age differences. Difference in sex cannot account for it. Scarlet Fever would appear, in fact, to have but little power of diffusion as regards distance or quantity of infection under ordinary conditions, and as it occurs at school. Its failure to spread to adjoining non-scarlatinal wards in hospital also strongly points in the same direction. It is suggested that crowding is favourable to its propagation. Further, it is suggested that the common use of closets is an element in its propagation, especially when these are defective. Extensive alterations are being carried out at this school.

To continue the list of Schools :—

VII. Large School, 3 departments—

Date	Sex	Age	Date	Sex	Age
10 I.	f	12 —	17 IV.	f	12 —
25 I.	f	11 —	6 V.	f	3 X
22 III.	f	12 —	15 X.	m	10 O

There was possibly an invasion of the girls' department early in the year.

VIII. Large School, 3 departments—

Date	Sex	Age	Date	Sex	Age
14 I.	m	5 X	8 IX.	f	7 —
15 I.	f	4 X	17 X.	f	11 —
16 I.	f	7 * —	22 XII.	f	7 —
29 V.	f	6 X			

Here there was probably an invasion of the infants' department in the beginning of the year.

IX. Large School, 3 departments—

Date	Sex	Age	Date	Sex	Age
17 I.	f	9 —	30 IX.	f	6 X
8 VI.	f	11 —	19 IX.	f	5 * X
27 VI.	f	4 X	17 IX.	f	8 * —
18 VIII.	m	9 O	10 X.	m	7 O
28 VII.	f	7 *	16 XI.	f	10 * —

Here there is no *clear* indication. It is noticeable, however, that the disease is confined to the girls' and infants' departments, the one case to the contrary (18 VIII.) having occurred during the holidays. The number of overlooked cases is also to be noted with the small result by way of extension.

X. School, 2 departments, no infants—

Date	Sex	Age	Date	Sex	Age
17 I.	m	10 O	17 X.	f	12 —
18 IX.	m	9 O	29 X.	f	9 —
23 IX.	f	10 —	20 XI.	m	10 O
25 IX.	f	9 —	24 XI.	m	6 O
28 IX.	f	10 —			

In this case there was probably invasion of the girls' department.

At School VIII. the infants, boys, and girls are together in the school. There are, however, separate yards and trough closets for boys, infant boys, girls, and infant girls. The closets are plug troughs, and are imperfectly cleansed. The floors are covered with urine. It is probable that here the influence of the closets was in evidence.

## XI. Large School, 3 departments—

Date	Sex	Age	Date	Sex	Age
16 I.	m	7 O	14 IX.	m	8 O
18 I.	m	3 X	9 XI.	m	13 O
7 XII.	m	12 * O	19 XI.	m	5 X
5 II.	m	9 O	21 XI.	f	6 X
1 V.	f	6 X	25 XI.	f	6 X
24 V.	f	4 X	16 XII.	f	14 —
26 VII.	f	10 —			

It seems likely that there was invasion towards the end of the year of the infants' department.

## XII. Junior girls and infants—

Date	Sex	Age	Date	Sex	Age
16 I.	m	7 O	29 V.	m	5 X
26 IV	f	4 X	27 IX.	f	6 X
30 IV.	m	6 X	13 X.	f	8 —
1 V.	f	7 X	17 X.	f	4 X

There was possibly an invasion of the infants department.

## XIII. School, mixed and infants—

Date	Sex	Age	Date	Sex	Age
24 I.	m	10 =	10 V.	f	5 X
13 II.	m	10 =	13 V.	f	8 =
16 II.	m	12 =	26 V.	m	10 =
24 II.	f	9 =	29 V.	m	4 X
23 III.	m	8 =	26 VII.	m	11 =
8 V.	m	5 X			

Here there is an invasion of the mixed department, which in the fifth month spreads to the infants.

## XIV. School, 2 departments, mixed and infants—

Date	Sex	Age	Date	Sex	Age
28 XII.	m	8 * =	8 IV.	f	7 =
31 I.	f	10 =	12 VI.	m	4 X
12 II.	m	11 =	12 VIII.	f	6 X
1 III.	f	10 =	18 VIII.	m	6 X
12 III.	f	13 =	18 IX.	m	10 =
14 IV.	f	6 X	4 XI.	f	7 X
14 IV.	f	4 X	13 XI.	f	12 =

Here there were possibly two invasions of the school. First in the mixed department, then in the infants. The first, only girls were attacked. Closets.

## XV. School, 2 departments, no infants—

Date	Sex	Age	Date	Sex	Age
18 II.	m	9 O	13 IX.	f	13 —
23 II.	f	11 —	17 X.	m	15 O
28 III.	m	13 O	19 X.	f	11 —
1 IX.	f	9 —	19 XI.	f	10 —
10 IX.	f	9 —			

At this school, only the girls' department was invaded.



## XVI. School, 3 departments—

Date	Sex	Age	Date	Sex	Age
20 II.	f	5 ×	28 VIII.	f	5 ×
4 III.	f	10 —	29 VIII.	f	4 ×
11 VI.	f	11 —	11 IX.	m	11 O
26 VI.	f	5 ×	11 X.	f	4 ×
29 VII.	f	12 —	16 X.	f	6 ×
11 VIII.	m	10 O	1 XI.	f	8 —
17 VIII.	m	9 O	16 XI.	m	6 ×
19 VIII.	f	10 —	27 XI.	f	4 ×
27 VIII.	m	7 ×	2 XII.	m	6 ×
27 VIII.	f	6 ×	27 XII.	f	3 ×

Two invasions. Girls' department, earlier in the year. Infants' in autumn.  
Closets.

## XVII. School, 2 departments, mixed and infants—

Date	Sex	Age	Date	Sex	Age
8 III.	f	9	3 VII.	f	5 ×
27 VI.	f	6 ×	1 VIII.	m	4 ×
7 VII.	m	5 ×	18 VIII.	f	6 ×
5 VII.	f	7 =	9 X.	m	8 =

Probable invasion of infants' department.

## XVIII. School, 3 departments—

Date	Sex	Age	Date	Sex	Age
15 III.	f	7 —	1 VIII.	f	20 *
7 V.	f	5 ×	20 IX.	m	6 ×
24 VII.	m	8 O	23 IX.	f	12 —
31 VII.	f	10 —	25 IX.	m	5 ×
1 VIII.	m	7 O	28 IX.	f	6 ×
7 VIII.	m	7 ×	30 IX.	m	7 ×
16 VIII.	m	6 ×	13 X.	m	5 ×
26 VIII.	m	5 ×	15 X.	m	6 ×
4 IX.	m	5 ×	19 X.	m	5 ×
5 IX.	f	7 ×	1 IX.	f	9 —
5 IX.	m	6 ×	13 XI.	f	5 ×
11 IX.	f	7 —	15 XI.	f	4 ×
11 IX.	f	7 ×	26 XI.	f	8 —
10 IX.	m	8 O	29 XI.	m	6 ×
13 IX.	m	3 ×	13 XII.	f	12 —
13 IX.	f	7 ×			

This extensive outbreak, it will be observed, is practically confined to the infants' department, with slight extension to the girls. It will further be noted that 5 cases occur during the holidays, so that the disease was no doubt imported at the re-opening of the school.

## XIX. School, 2 departments, mixed and infants—

Date	Sex	Age	Date	Sex	Age
16 IV.	f	11 =	17 VII.	m	5 ×
28 V.	f	8 =	19 VII.	f	8 =
29 V.	f	4 ×	10 IX.	f	8 =
17 V.	f	10 =	14 XI.	m	10 =
30 VI.	f	8 =			

Here the mixed department was invaded with a great preponderance of girls affected, and slight extension to the infants.

## XX. School, 3 departments—

Date	Sex	Age	Date	Sex	Age
20 V.	f	6 ×	13 VIII.	f	7 ×
30 V.	f	9 —	19 VII.	m	9 * ○
16 V.	f	10 —	28 VIII.	f	9 —
14 VI.	f	4 ×	3 IX.	m	10 ○
28 V.	f	8 —	10 IX.	f	5 ×
18 VII.	f	10 —	20 IX.	m	11 ○
20 VII.	f	6 ×	8 IX.	m	10 ○
26 VII.	f	9 —	19 XII.	f	5 ×
23 VII.	m	12 ○			

Here the girls' department is first invaded, with slight implication of the infants'. After the holidays the boys' department is affected most, probably from an imported case.

## XXI. School, 2 departments—

Date	Sex	Age	Date	Sex	Age
29 VI.	m	5 ×	18 VI.	m	4 ×
5 VII.	m	5 ×	13 VIII.	f	10 —
13 VII.	m	6 ×	16 VI.	f	3 ×

Implication of the infants' department before the holidays.

## XXII. School, 3 departments—

Date	Sex	Age	Date	Sex	Age
5 VIII.	m	8 ○	21 X.	f	8 —
16 VIII.	f	8 —	23 X.	m	6 ×
24 VIII.	f	8 —	25 X.	f	8 —
4 IX.	m	5 ×	4 XI.	f	6 ×
9 IX.	f	7 ×	22 XI.	m	6 ×
4 X.	m	7 ○	22 XI.	m	6 ×
14 X.	m	6 ×	1 XII.	f	10 —
20 X.	f	8 —			

Here there is a marked invasion after the holidays of the girls' and infants' departments, especially of the former, the disease slowly ramifying in both.

These schools have been given *in extenso* in order to mark by repetition the low degree of infectivity and the tenacity of the disease as regards particular departments. The interchange which takes place between girls and infants is largely due to the fact that they usually have playgrounds and, what is

possibly of more consequence, closets in common. I have already remarked at length on School II., and a report made to the Hospital Sub-Committee on School XVIII. may be here in part reproduced, as it corroborates the observations made in regard to School II., with the exception of the early interchange between the girls and infants.

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Public Health Office,

Town Hall, Manchester,

December 1st, 1897.

The Chairman of the  
Hospital Sub-Committee.

The Medical Officer of Health desires to draw the attention of the Sub-Committee to an inquiry into the incidence of Scarlet Fever on School XVIII., which has been tabulated for him by Inspector Hyslop on the accompanying plan, showing where the children have been placed in school

The numbers on the plan indicate the order in which the cases have occurred. The dates of occurrence are given on a separate sheet, from which the slow but steady propagation of the disease in the school can be made out.

In explanation of the plan, it should be said that the infants are on the ground floor of the school, the girls on the first floor, and the boys on the second floor. Further, it is to be observed that the infants and girls have a common playground and closets, the boys being restricted to a separate playground and closets.

We observe that, with the exception of No. 13, all the cases have occurred among the infants and girls. We may infer, therefore, that infection does not rise from one room to the room above.

Further, we must infer, I think, that when Scarlet Fever appears at a school, the danger of its spreading arises mostly from the aggregation of the children at school. It is very likely, I think, that the communication of the disease between the infants and girls takes place partly in the closets, which should, as far as possible, be separate for separate divisions of the school.

The manner in which Scarlet Fever has spread amongst the children is seen from this summary :—

No. 1—infants.

2, 3, 4—girls.

5, 6, 7, 8, 9, 10, 11—infants.

12—girl.

13—boy.

14, 15—infants.

16, 17, 18, 19—girls.

20, 21, 22, 23, 24, 25—infants.



Now, on reference to the Inspector's report, we find that the average attendance of boys is 714, of girls 660, of infants 573. If, therefore, the disease is equally or nearly equally liable to spread amongst the boys, girls, and infants, the data given above suffice to show that the infection attaches somehow to the school, and is there confined to particular departments. If we now excerpt the column of attacks given at page 22 of the last Annual Report of the Medical Officer of Health, we perceive that at the ages 3 to 6, which may be taken as the infant ages, the number of cases of Scarlet Fever reported, in proportion to the number of children living at those ages, is somewhat greater than at higher ages, not so much so, however, as materially to affect the significance of the figures showing the incidence of the disease on different portions of the school. Scarlet Fever, then, has got established, and has spread steadily in the school; while, at the same time, the effect on the propagation of the disease outside of those cases which have been contracted in the school has been, by comparison, slight.

*Medical Officer of Health.*

The low degree of infection is remarkable, but is probably to be explained by the sharpness of the onset in Scarlet Fever, the child being removed before the eruption has appeared. It would thus seem not to be highly infectious at its very inception.

Including schools in which the conditions are more complicated, we may say that in some 30, or about one-fifth, of those into which the disease was introduced, there is evidence of its spread in the school. In none, however, with the possible exception of II. and XVIII., can it be said to have become epidemic.

The statistics given by Dr. Shirley Murphy are clearly supported by this inquiry both as to fact and significance.

The detailed inquiry shows, further, that the extreme measure of closing a school for Scarlet Fever is but rarely called for, and is not so likely to effect the object aimed at as in the case of Measles.

#### SCARLET FEVER CONNECTION WITH DEFECTIVE PRIVIES.

From this subject we may pass on to consider the connection of the incidence of Scarlet Fever with defective conditions of privy. Taking the cases of Scarlet Fever not traced to direct infection in any manner, but including many of those which have been considered in connection with their

respective schools, we may represent the condition of affairs as follows :—

#### CASES NOT TRACED.

Pail Adjoins			Pail within Four Feet			Pail Four Feet and Over		
Guide not defective	Guide defective	Other-wise defective	Guide not defective	Guide defective	Other-wise defective	Guide not defective	Guide defective	Other-wise defective
354	47	56	39	8	9	334	50	24

Midden					Total
Adjoins	Within 6 feet	Six feet and over	Water-closets	Waste water-closets	
39	31	91	161	13	1,256

#### DOUBTFULLY TRACED CASES.

Pail Adjoins			Pail within Four Feet			Pail Four Feet and Over		
Guide not defective	Guide defective	Other-wise defective	Guide not defective	Guide defective	Other-wise defective	Guide not defective	Guide defective	Other-wise defective
77	10	13	12	1	3	72	5	4

Midden					Total.
Adjoins	Within 6 feet	Six feet and over	Water-closets	Waste water-closets	
6	6	15	21	6	251

It will be seen, on reference to the figures for 1896, that the closets do not show so close a connection with Scarlet Fever as in that year as regards defect of condition. As regards position, there is no material difference. The reason for this difference is, in the main, that a strenuous effort has been made to provide urine guides to the pail-closets, and so to avoid the wetting of the ground from this cause. As regards other defects, however, I am not aware that any improvement has taken place. On the whole it may be said that, with the exception mentioned, the same dangers attach to both pails and middens as before, and that the same evidence of an intimate relation is present.

## ON INFECTION IN SCARLET FEVER.

The cases clearly traced may be arranged as follows :—

Previous recent infection at home.....	386
Infection at school .....	0
From playmates .....	28
From overlooked cases .....	5
From cases at home discharged from hospital .....	25
From cases discharged from hospital not in the same house ...	8
From cases recovered at home .....	6
From cases recovered outside home .....	2
From other sources .....	2

The doubtfully traced cases classified as in the 1896 report are :—

At home .....	9
At school .....	73
Visiting infected houses .....	9
Neighbourhood infection .....	132
Recovery cases at home .....	1
Recovery cases outside .....	1
Discharge cases from hospital at home.....	7
Discharge cases from hospital not in the same house .....	2
From overlooked cases .....	18
From other sources .....	5

The miscellaneous sources from which Scarlet Fever may be contracted are represented in the following list, which differs in one marked respect from that of last year in the total absence of cases of Quinsy or Acute Tonsilitis, which numbered for that year 17. So numerous indeed were the cases of Quinsy that special comment was made on the frequency of their association with Scarlet Fever :—

No. on  
Register

## CASES DOUBTFULLY TRACED.

- 19 Sister had sore throat 11 days ago.
- 56 In contact with child whose death was certified "German measles."
- 67 Lodger had sore throat 13 days ago.
- 81 Playing with child next door who had sore throat.
- 87 Father has sore throat.
- 90 Brother was ill a week ago with running of nose and sickness.
- 93 Mother had sore throat 2 weeks ago.
- 116 Visiting an infected house 7 days ago.
- 185 In contact at school with girl now in hospital with scarlet fever.



- 199 In contact with woman from infected house.
- 209 In contact with child notified to be suffering from diphtheria.
- 211 Brother ill about 6 weeks ago, followed by slight desquamation.
- 231 Cloak in which scarlet fever patient had been wrapped used as a bed cover.
- 251 Sister had a rash and sore throat a month ago.
- 261 Brother had feverish cold and headache 3 weeks ago.
- 264 Parents theatricals. Three cases of measles at their last lodging-house.
- 278 Brother had running from eyes, sneezing, and sickness, with rash on chest, 5 weeks ago.
- 296 Said to have been in infected house.
- 324 Mother has had sore throat.
- 332 Visited infected house.
- 346 Brother suffering from measles.
- 351 Mother has slight sore throat.
- 376 Husband of patient has sore throat.
- 380 Believed to have been in contact with a scarlet fever patient.
- 381 Father, brother, and sister have had slight sore throats and sickness.
- 396 Sister had headache and sore throat 7 days ago.
- 418 Father recovered from diphtheria 2 weeks ago.
- 426 Playing with children who have had suspicious desquamation.
- 460 Children in same house have had measles.
- 461 Sister has had sore throat 6 days.
- 479 Mother just recovered from influenza.
- 480 Brother ill a few days ago with sickness and headache, no rash.
- 484 Visiting infected house.
- 496 Father is a Corporation disinfecter.
- 513 Mother and two brothers had sore throats a week ago.
- 604 Scarlet fever patient removed to hospital from next house but one, 6 days ago.
- 605 Scarlet fever patients removed to hospital 3 days ago from a house in the same street.
- 615 Playing with children who were removed to hospital 16 days ago suffering from scarlet fever.
- 649 Visitor discharged from Salford Hospital as recovered from scarlet fever 13 days ago.
- 652 Said to have been in contact with a hospital return case.
- 661 Been on a visit to a house where a child is suffering from catarrhal tonsilitis.
- 664 Case of scarlet fever nursed at home a few houses away.
- 757 Scarlet fever in a house on the opposite side of the street.
- 797 In contact with persons from a scarlatina infected house.
- 830 Believed to have played with child now suffering from scarlet fever.
- 889 Believed to have played with child just recovered from scarlet fever.

- 1169 Viewing corpse of child who died from scarlet fever.
- 1290 Probably contracted at Blackpool.
- 1318 Child just recovered from scarlet fever whose home is at Blackburn, been on a visit to this house.
- 1321 Playing with children from an infected house.
- 1324 Case of scarlet fever 3 houses away.
- 1388 Father is a medical practitioner, and is attending scarlet fever patients.
- 1507 Case of scarlet fever on the opposite side of street.
- 1540 Sister and brother had swollen tonsils 3 weeks ago.
- 1555 Playing with children from infected house.
- 1572 Very doubtful case of scarlet fever in same house.
- 1585 Case of scarlet fever next house but one.
- 1588 Playing with children from infected house.
- 1663 Suspicious case in same house.

## ON RETURN CASES OF SCARLET FEVER.

In the Annual Report for 1896 a full analysis was given of the cases occurring after the discharge of patients from hospital, and apparently in consequence of contact with the discharged patients. It was there shown that the phenomenon is essentially a hospital one, and grounds were given for believing that it was due to the recent association of the discharged patient with acute cases. If this were so, it would be necessary and sufficient, in order to prevent the occurrence, to isolate the patient for ten days to a fortnight in a convalescent ward, apart from infection, and to take efficient steps to remove the infection clinging to the convalescent when transferred from the acute ward. If the patient were to discharge infective matter into the convalescent ward in any quantity, such infection would again accumulate about the patient, and the return phenomena would recommence. In order to prevent this, it was considered that it would be necessary to inunct the patient with carbolic oil all over, after bathing, previous to transference to the convalescent ward, a bath being subsequently given every two days, and the inunction at once repeated after each bath. Further, it was considered necessary that the cavities about the face, and especially the nostrils, should be washed daily with a solution of permanganate of potash. The infective matter was believed to be stored chiefly in the nostrils for obvious reasons. In the case of discharging lesions, the ears require to be washed out to remove suppurative infective matter.

This, then, was the course adopted.



The wooden pavilions formerly used for Smallpox were utilised for the reception of the convalescent Scarlatinal cases, it being understood that they would not be sent into these wards until six weeks had elapsed from the commencement of illness, or until all sign of desquamation had disappeared. When these operations were commenced in January, 1897, only the cases free from discharging lesions were at first transferred, but afterwards, in March, cases with complications. It was hoped, however, that these might be treated in a separate ward, and this was during the summer actually done.

In addition to the measures above taken, the children in the convalescent wards were encouraged to take as much active exercise as possible with a view to stimulate the respiration, so as to assist in the dislodgment from the nasal cavities of collections of infective matter, and also, perhaps, to assist by oxidation in the destruction of the infective material.

The actual reduction of this view to practice has been completely successful in my opinion, and I believe also in the opinion of the Medical Superintendent of the Institution. This may not appear to have been the case on a mere examination of the data, without some analysis.

In assessing the results, it must be remembered that the operations were at first partial, up to March. From March onwards to September the experiment was carried out in its entirety.

In the beginning of September the cases in the hospital had increased to over 300, and it is probable that the same rigour of exclusion of infective cases from the convalescent wards was not sustained, and that the treatment was not so carefully carried out as it was at an earlier period of the year. Certainly by the middle of October the experiment could no longer be said to be in fair operation.

Now from January to March, and afterwards from March to September, in which latter period all the cases discharged from the hospital were subjected to the experiment, not a single return case occurred in connection with the Manchester patients discharged from the convalescent wards.

The total number of Manchester cases discharged from the convalescent wards during 1897 was 851, and these gave rise in all to 9 return cases, of which at least 6, and possibly all, occurred when the strict conditions of the experiment had ceased to be fulfilled.

The number of Manchester cases discharged direct from the acute wards was 338, giving rise to 14, or excluding an interval exceeding 14 days between return and eruption in the second case to 7 cases of return. I question whether more complete proof could be attained.



The percentage of returns amongst those discharged direct from the acute wards, excluding the doubtful cases, was 2·1 per cent.; amongst those discharged from the convalescent ward the percentage was 1·1 per cent.; the majority occurring, however, when the necessary isolation had ceased to be carried out.

It might be objected that these results were due, perhaps, to the season being unfavourable to the production of return cases. This is, however, disproved partly by the above figures, and partly by the experience of cases treated elsewhere.

In 1896 the total number of patients discharged from the hospital was 1,587—the total number of “clear” return cases from Monsall was  $40 + 19 = 59$ , of doubtful cases 22; total, 81.

In 1897 the total number of patients discharged was 1,189—the number of “clear” return cases 16, and the number of doubtful returns 7; total, 23. Nor do these figures, as has been explained, by any means represent the real amount of the improvement attainable under our procedure.

A certain amount of deduction must always be made for accidental occurrences. This amount may be gauged by taking the cases in which second occurrences of Scarlet Fever took place in the home about the period of discharge of the first case, but before the discharge actually occurred. They do not invalidate the occurrence of bona-fide return cases under unfavourable circumstances, but they much diminish its significance when the amount is small. In 1897 there were four such cases, as the Medical Officers at the Institution have pointed out to me, viz. :—

Escaped Returns	Date of discharge from hospital	Date of admission to hospital of 2nd case
J. U. ....	26 Nov. ....	25 Nov.
S. P. ....	12 Nov. ....	8 Nov.
L. G. ....	23 Nov. ....	24 Nov.
M. S. ....	5 Nov. ....	5 Nov.

Now, 4 cases among 1,189 discharges greatly diminishes the significance of 9 cases among 851 discharges, even had these been all subject to strict precautions.

In fact, looking at all the circumstances, I am of opinion that we have fairly proved our case.

All work of this nature may be easily vitiated and frustrated by carelessness or indifference, and much credit must be given to the Medical Superintendent of Monsall Hospital, and to the Sister in Charge of the convalescent wards, for the care with which the necessary precautions were carried out, so long and so far as this was possible.

The particulars relating to the “return” cases for Monsall Hospital in 1897 are as follows :—

PARTICULARS OF RETURN CASES IN 1897 FROM MONSALL  
SUPERINTENDENT

*List of Patients Discharged*

Prog. No. of 2nd Case	Date of Eruption	Prog. No. of previous Case	Date of Notification of 1st Case	Date of Eruption of 1st Case	Date of Removal to Hospital	Date of Return Home	Interval between Return and Eruption in 2nd Case	Interval between Eruption in 1st and 2nd Case
	1897						Days	Days
47	12th Jan.	2064	22nd Oct.	21st Oct.	22nd Oct.	5th Jan.	7	83
78	19th Jan.	2207	16th Nov.	16th Nov.	16th Nov.	29th Dec.	21	64
100	24th Jan.	2107	30th Oct.	29th Oct.	30th Oct.	12th Jan.	12	86
150	15th Feb.	2268	30th Nov.	30th Nov.	30th Nov.	12th Feb.	3	77
291	23rd Mar.	2389	29th Dec.	29th Dec.	29th Dec.	2nd March	21	84
367	13th April	2378	28th Dec.	25th Dec.	28th Dec.	26th Mar.	18	108
387	19th April	129	3rd Feb.	3rd Feb.	3rd Feb.	30th Mar.	20	55
413	26th April	105	28th Jan.	23rd Jan.	28th Jan.	15th April	11	62
845	About 4th Aug.	398	24th April	About 3rd April	24th April	25th June	40	123
1262	12th Oct.	822	3rd Aug.	1st Aug.	3rd Aug.	8th Oct.	4	73
1409	2nd Nov.	920	23rd Aug.	21st Aug.	23rd Aug.	15th Oct.	18	73
1550	19th Nov.	1081	18th Sept.	18th Sept.	18th Sept.	12th Nov.	7	62
1733	20th Dec.	1371	29th Oct.	29th Oct.	29th Oct.	14th Dec.	6	51
1761	26th Dec.	1057	15th Sept.	13th Sept.	15th Sept.	7th Dec.	19	104

HOSPITAL, WITH NOTES THEREON BY THE MEDICAL  
OF THE HOSPITAL.

*from Acute Wards.*

Contracted at		Complications of First Case during stay in Hospital	Condition of First Case when Discharged
Home	Another House		
†	...	None.	Soles of feet not quite smooth.
†	...	Paronychia, nasal discharge (thin), nephritis.	Nothing observed.
†	...	Otitis (2), sore nose.	Ears discharged, doubtful nasal discharge
†	...	Alb. ; slight nasal discharge.	Nothing observed.
†	...	Otitis (2), glossitis, adenitis, supp.	Nothing observed.
†	...	Otitis (L.), alb.	Nothing observed.
†	...	Supp. axillary adenitis, from wound on thumb.	Nothing observed.
†	...	None.	Nothing observed.
†	...	None.	Nothing observed.
†	...	Nephritis, otitis (2), adenitis, synovitis.	Ears discharging.
...	†	None.	Nothing observed.
†	...	Sore nose, adenitis.	Nothing observed.
†	...	None.	Nothing observed.
†	...	Alb ; nasal discharge, sore nose.	(?) Nasal discharge.



## LIST OF PATIENTS DISCHARGED

Prog. No. of 2nd Case	Date of Eruption	Prog. No. of previous Case	Date of Notification of 1st Case	Date of Eruption of 1st Case	Date of Removal to Hospital	Date of Return Home	Interval between Return and Eruption in 2nd Case	Interval between Eruption in 1st and 2nd Case
							Days	Days
1059	13th Sept.	510	25th May	23rd May	25th May	7th Sept.	6	113
1120	Onset, 22nd Sept.	584	14th June	13th June	14th June	10th Sept.	12	101
*1166	30th Sept.	814	8th Aug.	31st July	1st Aug.	24th Sept.	6	61
1510	15th Nov.	986	6th Sept.	5th Sept.	6th Sept.	2nd Nov.	13	71
1604	29th Nov.	1126	25th Sept.	25th Sept.	25th Sept.	19th Nov.	10	65
1611	30th Nov.	1026	13th Sept.	12th Sept.	13th Sept.	19th Nov.	11	79
§1662	8th Dec.	1247	11th Oct.	11th Oct.	11th Oct.	26th Nov.	12	58
1723	18th Dec.	1297	19th Oct.	17th Oct.	19th Oct.	10th Dec.	8	62
1791	30th Dec.	1455	9th Nov.	11th Oct.	9th Nov.	28th Dec.	2	80

NOTE.—\* One month after admission of this patient into hospital, another child was

§ The patient who was supposed to have contracted Scarlet Fever from this case having had a recent attack of scarlatina could be found.

Cases with complications were received from March 12th and October 17th in Wards XV. and XVII., cases with complications were being treated in these wards.

Ward XVI. has all along been used for the reception of cases with complications.

FROM CONVALESCENT WARDS.

Contracted at		Complications of First Case during stay in Hospital	Condition of First Case when Discharged
Home	Another House		
†	...	Otitis (2), cellulitis supp. right parotid region, adenitis supp.	Ears discharging.
...	†	None.	Nothing observed.
†	...	Synovitis, nasal discharge alb.	Nothing observed.
†	...	None.	Nothing observed.
†	...	Nephritis.	Nothing observed.
†	...	Albuminuria.	Slight roughness of skin— right heel.
†	...	Nephritis otitis (R.).	Nothing observed.
†	...	Adenitis—sore nose.	Sore nose dried.
†	...	Adenitis, alb.	Herpes on upper lip.

admitted from same house.

was carefully examined on admission and during stay in hospital, but no trace of his

XV. and XVII. respectively, so that at the time the above cases were discharged from

## ANNUAL TABLES RELATING TO SCARLET FEVER.

It will be seen from the accompanying tables that the number of cases of scarlet fever reported in 1897 was considerably below those reported in 1896, and that the mortality was decidedly lower. The percentage of cases removed to hospital was higher than in any previous year.

### SCARLET FEVER ATTACKS, 1897.

DISTRICTS OF MANCHESTER	ATTACKS	ATTACK RATE PER 1,000 LIVING	† CASE FATALITY, PER CENT.	REMOVALS TO HOSPITAL, PER CENT.
Ancoats .....	211	4·61	9·5	89·1
Central .....	178	4·92	7·3	91·6
St. George's .....	132	2·07	7·6	86·3
Cheetham .....	192	6·19	3·1	81·8
Crumpsall .....	29	3·03	13·8	75·8
Blackley .....	7	0·87	14·3	28·6
Harpurhey .....	24	2·02	8·3	58·3
Moston .....	14	2·13	...	35·7
Newton Heath... ..	109	2·94	6·4	69·8
Bradford .....	94	4·11	20·2	78·7
Beswick .....	35	3·24	11·4	91·4
Clayton .....	17	4·13	11·8	100·0
Ardwick .....	123	3·28	8·1	83·7
Openshaw.....	119	3·68	5·9	73·2
Gorton (West) .....	76	2·75	5·3	77·6
Rusholme and Kirk.	47	2·41	4·3	51·1
Chorlton-on-Medlock.	207	3·36	4·3	71·5
Hulme .....	176	2·45	5·7	80·1
<b>City of Manchester</b>	<b>1,790</b>	<b>3·34</b>	<b>7·3</b>	<b>79·7</b>

† Corrected : the fatal cases are those actually occurring amongst the cases notified.



The following table exhibits the number of attacks at different ages, and the percentage of fatal cases at each age :—

SCARLET FEVER, 1897.

AGES	ATTACKS	DEATHS	CASE FATALITY*
Under one year.....	19	6	31·6
1 to 2 years .....	82	19	23·2
2 to 3 „ .....	147	31	21·1
3 to 4 „ .....	148	13	8·8
4 to 5 „ .....	175	20	11·4
5 to 6 „ .....	190	9	4·7
6 to 7 „ .....	167	5	3·0
7 to 8 „ .....	173	5	2·9
8 to 9 „ .....	121	6	5·0
9 to 10 „ .....	91	3	3·3
10 to 15 „ .....	297	3	1·0
15 to 20 „ .....	105	8	7·6
20 to 25 „ .....	40	1	2·5
25 to 35 „ .....	26	...	...
35 to 45 „ .....	6	...	...
Over 45 „ .....	3	1	33·3
All ages.....	1,790	130	7·3

\* The figures in this column are the actual proportions of fatal cases to the attacks at those ages.

*Percentage of Deaths in cases of Scarlet Fever at Different Ages.*

SCARLET FEVER, 1891, 1892, 1893, 1894, 1895, 1896, AND 1897.

AGES	ATTACKS	DEATHS	CASE FATALITY
Under one year.....	201	44	21·9
1 to 2 years .....	606	124	20·5
2 to 3 „ .....	1,108	174	15·7
3 to 4 „ .....	1,420	188	13·2
4 to 5 „ .....	1,471	142	9·7
5 to 6 „ .....	1,441	96	6·7
6 to 7 „ .....	1,262	63	5·0
7 to 8 „ .....	1,123	43	3·8
8 to 9 „ .....	896	24	2·7
9 to 10 „ .....	712	18	2·5
10 to 15 „ .....	2,046	40	2·0
15 to 20 „ .....	647	19	2·9
20 to 25 „ .....	286	9	3·1
25 to 35 „ .....	234	5	2·1
35 to 45 „ .....	72	3	4·2
Over 45 „ .....	26	1	3·8
All ages.....	13,551	993	6·9

SCARLET FEVER. ATTACKS IN WEEKS ACCORDING TO DATE OF RASH.

FIRST QUARTER			SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER	
Jan. 9	21		April 10	21	July 10	33	Oct. 9	44
" 16	33		" 17	23	" 17	38	" 16	43
" 23	33		" 24	26	" 24	41	" 23	58
" 30	22		May 1	30	" 31	25	" 30	52
Feb. 6	14		" 8	18	Aug. 7	36	Nov. 6	51
" 13	13		" 15	28	" 14	30	" 13	62
" 20	16		" 22	20	" 21	38	" 20	43
" 27	26		" 29	24	" 28	35	" 27	50
Mch. 6	27		June 5	20	Sept. 4	40	Dec. 4	37
" 13	34		" 12	35	" 11	43	" 11	37
" 20	28		" 19	27	" 18	52	" 18	43
" 27	33		" 26	30	" 25	52	" 25	41
April 3	26		July 3	42	Oct. 2	57	Jan. 1 '98	39
Total...	326		Total...	344	Total...	520	Total...	600

City Total, 1,790.

SCARLET FEVER ATTACKS.—RATE PER 1,000 LIVING.

	1892	1893	1894	1895	1896	Mean	1897
Twelve Notification Towns*...	4'55	5'19	4'23	3'40	4'77	4'43	3'87
City of Manchester .....	3'25	3'92	4'27	4'37	4'42	4'05	3'34
Manchester Township .....	3'63	2'45	3'77	4'23	3'48	3'51	3'58
North Manchester .....	4'64	5'14	5'02	4'24	4'25	4'66	3'67
South Manchester .....	4'28	4'16	4'16	4'52	5'08	4'44	3'01

\* These are Blackburn, Bolton, Bradford, Halifax, Huddersfield, Hull, Liverpool, Oldham, Preston, Salford, Sheffield, and Warrington.

SCARLET FEVER MORTALITY.—RATE PER 1,000 LIVING.

	1892	1893	1894	1895	1896	Mean	1897
England and Wales.....	0·19	0·24	0·17	0·15	0·18	0·19	0·15
33 Great Towns .....	0·25	0·29	0·21	0·18	0·22	0·23	0·18
London.....	0·27	0·37	0·22	0·19	0·21	0·25	0·18
<b>Manchester City</b> .....	0·27	0·27	0·22	0·33	0·37	0·29	0·23
Manchester Township .....	0·35	0·23	0·26	0·37	0·41	0·32	0·27
North Manchester .....	0·39	0·39	0·18	0·24	0·24	0·25	0·29
South Manchester .....	0·16	0·23	0·22	0·35	0·41	0·27	0·17
67 Smaller Towns .....	0·20	0·20	0·16	0·16	0·20	0·18	0·15
Rural Districts.....	0·15	0·20	0·14	0·12	0·14	0·15	0·12

DIPHTHERIA.

During the year 1897, 318 cases were submitted to bacteriological examination for Diphtheria, and 22 cases were not, for various reasons, examined.

Of the 318 cases, 230 gave negative results, of which 218 were accepted by the medical attendant; while in 12 cases the clinical diagnosis was adhered to, as against the bacteriological diagnosis.

Eighty-eight cases gave a positive result, that is to say, the bacillus diphtheriæ was demonstrated in the materials sent to Professor Delépine for examination.

If, now, we add the 88 cases shown bacteriologically to be Diphtheria to the 12 cases in which the medical attendant adhered to his diagnosis, and to the 22 cases in which no examination was made, we get a total of 122 cases accepted and dealt with as Diphtheria.

To these we must add 27 cases certified to be suffering from Membranous Croup, in which the test was almost never applied, though a tube is in all cases sent. This omission is often due to the case certified being moribund, or dead, when the tube arrives.

Altogether, therefore, the number of cases finally accepted as Diphtheria or Membranous Croup in 1897 was 149. It will be seen from the following figures that a considerable reduction has taken place in the number of cases requiring to be dealt with at home, and in the numbers removed to hospital.



## DIPHTHERIA AND MEMBRANOUS CROUP.

	1891	1892	1893	1894	1895	1896	1897
Notified .....	456	497	622	512	402	325	244
Accepted .....	...	...	...	...	...	239	149
Removed to hospital ...	87	122	114	117	69	48	46

In the Annual Report for 1896, reasons were given for assuming that cases found bacteriologically to yield no evidence of Diphtheria, in which, moreover, the result of the test was accepted by medical men, might be safely left out of account in the routine work of administration, to the considerable saving of expense and trouble, so that our more intimate knowledge of the distribution of Diphtheria cannot be regarded as involving additional expense.

Of the 88 cases diagnosed bacteriologically to be suffering from Diphtheria, 17 died.

Of the 12 cases yielding negative results, but in which the medical attendant adhered to the diagnosis, 3 died, their ages being 13 months, 6 months, and 24 years. The ages are mentioned, since infants die readily from other causes.

Of the 22 cases not examined, 11 died.

Of the 27 cases of Membranous Croup 16 died.

Of the 88 cases diagnosed bacteriologically as Diphtheria, 18 or over 20 per cent. showed paresis or paralysis, as follows :—

No. 2 Hearing.	No. 73 Vision.
9 Difficulty in swallowing and breathing.	88 Vision.
18 Eyesight. Nasal speech.	90 Swallowing.
20 Memory.	91 Swallowing.
36 Vision.	97 Nasal speech. Walking defective.
50 Nasal speech.	102 Nasal speech. Difficulty in breathing and swallowing. Sudden death during apparent recovery.
58 Ptosis. Vision. Swallowing.	109 Swallowing and breathing.
63 Sudden death during apparent recovery.	111 Vision, swallowing, walking.
67 Sudden death during apparent recovery.	116 Vision and speech.

Histories of definite exposure to infection were made out in 18 cases. Other possible sources of infection were recorded in 11, of whom 3 were ascribed to illness in the domestic cat, 1 was a sanitary inspector, and 2 were ascribed to overlooked attacks. In all, 4 were ascribed to overlooked cases.

In the following instances marked defects were found :—

- 5 m. æt. 22.—Damp, dirt, disrepair.
- 8 f. æt. 3.—Yard and cellar drains defective.
- 12 m. æt. 5.—Slop-pipe defective.

- 16 f. æt. 3.—House damp, dilapidated.
- 17 m. æt. 2.—Disrepair, damp, dirt.
- 18 m. æt. 4.—Damp.
- 20 f. æt. 24.—Disrepair, damp.
- 26 m. æt. 40.—Drains in cellar defective.
- 27 m. æt. 8.—Drains defective
- 35 f. æt. 3.—School closets defective.
- 41 f. æt. 3.—Disrepair and damp.
- 42 f. æt. 27.—Drains defective.
- 43 m. æt. 4.—House in disrepair.
- 53 f. æt. 15.—House damp in roof.
- 55 f. æt. 26.—Yard surface defective.
- 58 f. æt. 38.—Yard drains defective.
- 60 m. æt. 3.—Surface of yard and kitchen defective.
- 62 m. æt. 2.—Drains defective.
- 69 f. æt. 23.—Slop-pipe defective.
- 70 f. æt. 25.—Surface of yard defective.
- 71 f. æt. 1.—Disrepair.
- 75 m. æt. 23.—Damp house and yard, surface defective.
- 78 m. æt. 24.—Disrepair and damp.
- 81 f. æt. 10.—Surface of yard and scullery defective.
- 83 m. æt. 5.—Disrepair.
- 88 f. æt. 52.—Drains defective.
- 97 f. æt. 7.—Drains defective.
- 100 f. æt. 6.—Slop-pipe connected to drain.
- 109 m. æt. 3.—Drains defective.
- 114 m. æt. 23.—Drains and yard defective.
- 115 m. æt. 3.—Yard surface defective.
- 122 f. æt. 6.—Drains in cellar area stopped.

In all, 32 cases were found to be in connection with defective conditions as enumerated above. Of these, 27 and 41 have been clearly traced to a previous source of infection, and may, therefore, be excluded, as may the doubtfully traced cases 78 and 83, leaving 28 cases in connection with defects.

It will be noted that 59 cases out of 88 were altogether untraced. Having regard to the large part that slight overlooked cases have been found to play in Diphtheria, it is probable that a more searching inquiry would have discovered not a few overlooked attacks in relation to these cases.

The 28 defective conditions found in connection with Diphtheria consist, as will be seen, in the main, of damp of an organic nature, which precisely accords with the result of analysis of the cases for 1896.

It is therefore of interest to ascertain the relation of the cases not clearly traced, numbering 70, to conditions of closet accommodation :—

Pail adjoins house	Defective	Pail within four feet	Defective	Pail four feet and over	Defective	Total
19	3	2	1	21	1	47
22		3		22		
Midden adjoins house		Midden within six feet		Midden six feet and over		12
5		3		4		
Water-closet		Defective		Waste Water-closet		11
8		2		1		
Grand Total ... ..						70

The distribution of the 122 cases of Diphtheria finally accepted as regards age and sex, was as follows :—

CASES POSITIVELY DIAGNOSED					
Males under 5	Females under 5	Males 5-14	Females 5-14	Males 15 and upwards	Females 15 and upwards
13	13	11	21	15	15
Total Males			Total Females		
39			49		
88					

Accepted cases negatively diagnosed or not examined :—

Males under 5	Females under 5	Males 5-14	Females 5-14	Males 15 and upwards	Females 15 and upwards
7	6	5	7	2	7
Total Males			Total Females		
14			20		
34					



For Membranous Croup the figures are :—

Males under 5	Females under 5	Males over 5	Females over 5	Total
13	9	3	1	26

Of these, 16 died, of whom 14 were under 5 years of age. Ten of the deaths were in males.

It will be seen that these figures are in general accord with those obtained last year, and emphasise the statement made in last year's report, that young children at home appear to be specially liable to true Diphtheria. Indeed, these figures point even more strongly in this direction than do those of last year.

So far as this goes, it indicates either that insanitary conditions, such as damp and foul soil, have a considerable share in the production of the disease, or that there is a large amount of slight Diphtheria altogether overlooked. I incline to the view that the condition of the soil has to do with the production of the disease. When the number of cases is arranged in a seasonal curve, we find that the annual curve corresponds to that of Scarlet Fever, Typhoid Fever, and Summer Diarrhœa, with an apex differing in point of time. It also corresponds generally with the annual curve of temperature, and with the curve showing the amount of carbonic acid at a given depth in the soil.

That the special incidence on young children who have not yet gone to school is for the most part not due to known sources of infection is seen by comparing the previous figures with the records, which show that the ages of those whose histories of infection are known are as follows :—

Age in years of secondary cases.	Number of secondary cases.
1	2
2	0
3	2
4	3
5	1, school infection
6	3, school infection in one
7	1
8	2
9	1
10 and over	3, of whom 2 were due to overlooked cases.
—	
Total, 18	
—	

In the course of last year's analysis, no evidence was discovered of any influence exerted by school in the propagation of the disease. If we apply the rules that there shall be no known source of infection other than school, that the children shall belong to the same department of the school, and that the interval between the attacks must not exceed two months, we find that there is a possibility of transmission between known cases having occurred at school in 5 schools, 3 of them having had 3 consecutive cases in one department, and two having had 2 consecutive cases. All these 13 cases were females.

As regards the distribution of the cases in districts, the 88 cases were apportioned as follows :—

DIPHTHERIA.—POSITIVE RESULTS IN DISTRICTS.

Number in Districts	Ancoats	Central	St. George's	Cheet-ham	Crump-sall	Blackley	Harpur-hey	Moston	Newton
	I	5	15	14	3	2	0	3	11
	Bradford	Beswick	Clayton	Ardwick	Open-shaw	West Gorton	Rusholme	C.-on-M.	Hulme
	3	1	0	3	1	0	7	14	5

Total, 88.

Taking for the present the total accepted figures, we find that both in 1896 and 1897 Ancoats had the lowest attack rate of all the districts—the highest attack rates in 1896 being in Moston, Clayton, Cheetham, Harpurhey, and Crumpsall; in 1897 in Cheetham, Crumpsall, Blackley, Rusholme, Clayton, and Moston.

There is thus a general tendency to persistence in the same districts.

If we consult the table at the end of this section, we find that the relation of the main divisions of the City as regards health in general is exactly reversed as regards Diphtheria, the attack rate being steadily highest for North Manchester, and higher for South Manchester than for the Manchester Township.

Inasmuch as we may assume that nearly all the cases of Membranous Croup are true Diphtheria, it is of much interest also to ascertain the conditions of the house in the 26 cases notified.

- Case 1 Female æt. 2.—House old, in bad repair, dirty. Foundations damp.  
 2 m. æt. 21 months.—Pigeon cote on roof. Pail adjoins house.  
 3 m. æt. 2.—House dirty; damp scullery from defective slopstone.  
 4 m. æt. 4.—Dirty cellar. Pail-closet practically inside scullery. Two cats.  
 5 f. æt. 2.—House abutting on the Medlock. Much disrepair.  
 6 m. 14 months.—Midden 5 feet distant.  
 8 m. 18 months.—Pail abuts on scullery. Lately defective.  
 9 f. 3 years.—House dirty. Pail-closet under bedroom.  
 10 f. 7 years.—Pail-closet abuts on scullery. Floor damp.  
 11 f. 3 years.—No bad condition stated.  
 12 m. 4 years.—No bad condition, pail 3 feet distant.  
 13 f. 10 years.—Midden adjoins. School overhauled.  
 14 f. 1½ years.—Pail-closet adjoins. Floor needs cleansing.  
 15 f. 2 years.—Case probably not croup; no sanitary defects.  
 16 m. 4 years.—Kitchen floor broken.  
 17 m. 2 years.—No defect noted.  
 18 m. 2 years.—House in disrepair, dirty, damp; closet 4 feet distant; defective.  
 19 m. 2 years.—House dirty. Pail adjoins.  
 20 f. 1¼ years.—Pail defective. Single house.  
 21 m. 5 years.—Pail full, overflowing; yard broken, slop-pipe short, &c.  
 22 f. 1 year.—Case of summer diarrhoea. No special defect.  
 23 m. 3 years.—Pail adjoins kitchen.  
 24 m. 10 months.—No defects noted.  
 25 f. 2 months.—Pail adjoins.  
 26 m. 5 months.—Drains defective.  
 27 m. 2 months.—Pail adjoins.

From these it will be seen that, in the great majority of cases, conditions inimical to health were present, and that the general effect of these was to lead to pollution of the soil.

We might reasonably have anticipated that, with the excellent results obtained from the use of antitoxin in the treatment of Diphtheria, there would have been some tendency to increase in the proportion of cases sent to the hospital for treatment. This, however, has not proved to be the case.

It ought to be possible to arrive at better results as regards the mortality occurring amongst cases of Diphtheria, and to this object we may profitably for the present direct our attention. Meantime, a map is being prepared showing the incidence of cases known to be Diphtheria, beginning with the year 1896.

So far, then, as we have hitherto gone, our inquiries tend to connect the occurrence of Diphtheria with contamination of the soil and house by organic damp.

No evidence has been obtained from bacteriological examination that the cats which have been found ill in connection with Diphtheria have in reality been suffering from that disease.

No evidence has been obtained inculpating any milk supply.



As regards direct infection, 18 out of 88 cases have been clearly traced to previous cases. Out of 122 possible cases of Diphtheria, four have been connected with previous overlooked cases—a proportion undoubtedly too small. There has been reason to suspect transference of the disease at school in five instances.

The cases reported as Membranous Croup have for the most part not been examined bacteriologically.

They have been found in the New York Investigation to yield a very high proportion of positive results to bacteriological examination, and may, therefore, be generally regarded as cases of true Diphtheria.

In not one of these was any connection with previous illness in the family discovered by the Sanitary Inspector. In one instance only a previous attack had occurred a year before. On the other hand, the connection with easily ascertained insanitary conditions is most intimate.

Referring now to the tables at the end of this section, it will be seen that the low percentage of removals to the hospital is mainly due to one large district, viz., Hulme, and that in other districts a distinct advance has taken place in this respect. From the gradually accumulating records, we find that the fatality of Diphtheria rapidly diminishes with advancing years: a consideration which again urges us to take additional action with a view to diminishing fatality at the early ages.

DIPHTHERIA, MEMBRANOUS CROUP.—RATES OF ATTACK, 1897.

DISTRICTS OF MANCHESTER	ATTACKS	ATTACK RATE PER 1,000 LIVING	† CASE FATALITY, PER CENT.	HOSPITAL REMOVALS, PER CENT.
Ancoats .....	1	0·02	...	100·0
Central .....	12	0·33	5·0	25·0
St. George's .....	19	0·30	26·3	36·9
Cheetham .....	19	0·61	47·4	36·9
Crumpsall .....	5	0·52	20·0	80·0
Blackley .....	4	0·50	...	50·0
Harpurhey .....	1	0·08	...	...
Moston .....	3	0·46	33·3	...
Newton Heath .....	13	0·35	15·4	23·1
Bradford .....	4	0·17	50·0	75·0
Beswick .....	2	0·19	50·0	50·0
Clayton .....	2	0·49	...	...
Ardwick .....	8	0·21	50·0	50·0
Openshaw .....	2	0·06	100·0	...
Gorton (West) .....	3	0·11	66·7	...
Rusholme and Kirk.	11	0·56	36·4	27·3
Chorlton-on-Medlock	24	0·39	25·0	20·8
Hulme .....	17	0·24	23·5	5·9
<b>City of Manchester</b>	<b>150</b>	<b>0·29</b>	<b>32·7</b>	<b>29·3</b>

† Corrected: the fatal cases are those occurring amongst the cases actually notified.

DIPHThERIA, MEMBRANOUS CROUP, 1897.

AGES	ATTACKS	DEATHS	CASE FATALITY, PER CENT.
Under one year.....	4	4	100·0
1 to 2 years .....	10	7	70·0
2 to 3 „ .....	16	14	87·5
3 to 4 „ .....	17	3	17·7
4 to 5 „ .....	14	4	28·6
5 to 6 „ .....	10	7	70·0
6 to 7 „ .....	8	4	50·0
7 to 8 „ .....	7	1	14·3
8 to 9 „ .....	6	1	16·7
9 to 10 „ .....	6	...	...
10 to 15 „ .....	11	2	18·2
15 to 20 „ .....	6	...	...
20 to 25 „ .....	17	...	...
25 to 35 „ .....	10	1	10·0
35 to 45 „ .....	5	1	20·0
Over 45 „ .....	3	...	...
All ages.....	150	49	32·7

NOTE.—The discrepancy of one between the tables and the letterpress is owing to the circumstances that the former are prepared from the outset of the illness, and the latter by the cases notified during the year.

PERCENTAGE OF DEATHS IN CASES OF DIPHTHERIA AT DIFFERENT  
AGES, FOR THE YEARS 1891-2-3-4-5-6-7.

AGES	ATTACKS	DEATHS	CASE FATALITY
Under one year.....	90	67	74·6
1 to 2 years .....	231	158	68·4
2 to 3 „ .....	247	152	61·5
3 to 4 „ .....	283	134	47·3
4 to 5 „ .....	243	100	41·1
5 to 6 „ .....	200	78	39·0
6 to 7 „ .....	108	32	29·7
7 to 8 „ .....	105	23	21·9
8 to 9 „ .....	87	16	18·4
9 to 10 „ .....	83	10	12·1
10 to 15 „ .....	295	19	6·4
15 to 20 „ .....	255	14	5·5
20 to 25 „ .....	205	5	2·4
25 to 35 „ .....	259	8	3·1
35 to 45 „ .....	124	3	2·4
Over 45 „ .....	63	2	3·2
All ages .....	2,878	821	28·6

DIPHTHERIA MORTALITY.—RATE PER 1,000 LIVING.

	1892	1893	1894	1895	1896	Mean	1897
England and Wales .....	0·22	0·32	0·28	0·25	0·29	<b>0·27</b>	0·24
33 Great Towns .....	0·27	0·43	0·38	0·36	0·38	<b>0·36</b>	0·31
London .....	0·46	0·76	0·62	0·53	0·60	<b>0·59</b>	0·51
<b>Manchester City</b> .....	0·25	0·35	0·29	0·21	0·15	<b>0·25</b>	0·08
Manchester Township .....	0·32	0·30	0·27	0·16	0·13	<b>0·24</b>	0·08
North Manchester .....	0·30	0·38	0·37	0·37	0·23	<b>0·33</b>	0·10
South Manchester .....	0·18	0·37	0·24	0·16	0·12	<b>0·21</b>	0·08
67 Smaller Towns .....	0·15	0·19	0·19	0·23	0·25	<b>0·20</b>	0·24
Rural Districts .....	0·16	0·24	0·24	0·19	0·23	<b>0·21</b>	0·19

DIPHTHERIA AND MEMB. CROUP.—RATES OF ATTACK PER 1,000 OF POPULATION.

	1892	1893	1894	1895	1896	Mean	1897
Twelve Notification Towns ...	0·53	0·54	0·51	0·47	0·62	<b>0·53</b>	0·58
<b>City of Manchester</b> .....	0·97	1·20	0·98	0·76	0·44	<b>0·87</b>	0·29
Manchester Township.....	0·95	0·90	0·73	0·48	0·32	<b>0·68</b>	0·22
North Manchester .....	1·23	1·45	1·48	1·39	0·67	<b>1·24</b>	0·37
South Manchester .....	0·84	1·25	0·85	0·58	0·39	<b>0·78</b>	0·26

From the above table, it will be seen that the case-rate in North Manchester was considerably above that in either of the other divisions.

ON ENTERIC FEVER.

On referring to the tables at the end of this section, it will be seen that the proportion of notified cases removed to hospital during 1897 reached the unprecedented figure of 58·6 per cent. Further, the attack rate is lower than in any year since 1892, except in 1895. There was, however, an unusually marked preponderance of cases at the end of the year. On referring to the



table showing the case fatality for the years 1891-97, we see that, as the numbers of cases reported add up, it tends to assume a definite and graduated form the fatality decreasing from infancy up to the age of 8, and thence rapidly increasing. The districts most affected in 1897 were Openshaw and West Gorton.

The feature of the year has been the great success of the serum test. Doubtless there have been many difficulties in getting it utilised to the extent which one would wish. If, however, the very maximum of utility has not been reached, we have not very materially fallen short of it, and the Sanitary Committee are to be congratulated on the demonstration that so great an innovation is susceptible of voluntary working. It is true that one might imagine that a confirmation of diagnosis so valuable would be gladly used by medical men. But such theoretical expectations are falsified by many considerations which do not reveal themselves until the attempt has been made. It is, therefore, a source of much gratification to know that the medical men of this City are so ready to support the Public Health Department.

A large share of the success of this procedure in Manchester is, I know, due to the confidence placed in the care with which the test has been conducted by Professor Delépine, and in his knowledge of the subject. The advantages which the Corporation have derived are no less material than those which the medical men receive. It has been possible to trace overlooked cases of a slight nature which have recovered, cases of such a nature that, without this aid, they could not possibly have been diagnosed, and the danger which has thus arisen and remains in the neighbourhood of houses has been gauged and dealt with.

Unsuitable cases have not been received into the Fever Hospital, and both expense and trouble have thus been avoided both in the treatment of cases and in unnecessary administrative procedures.

We shall in the future be able, if the same measure of support is obtained from the medical profession, to mark out the distribution of the disease with absolute confidence. It is true, in a very limited number of cases, the test fails. But the same procedure is adopted as with Diphtheria, and if, on a careful consideration of the circumstances, the clinical diagnosis appears to be correct, it is accepted. On the other hand, the event has shown that even more confidence can be placed in the blood serum test than in the diphtheritic examinations.

This work has already been begun, and the cases for 1897 have been plotted out on a large Map of Manchester. When this has been continued for some years, I have no doubt that some valuable conclusions will be arrived at.

The facts as regards the application of the serum test are these :—

During 1897, 650 cases of Enteric Fever were reported to the Medical Officer of Health. Of these, 18 were notified previous to the introduction of the test. Since then, 632 cases have been reported. In all, 72, for one reason or another, have not been examined, including the 18 cases before the test was brought into use. There have, however, been 623\* cases examined, including cases which had been overlooked, and so failed to be notified.

The results have been positive in 380 instances and negative in 243 instances. Thus the proportion of cases examined which have proved positive has been 61 per cent.

Of the cases giving a negative reaction, 32 have been contested by medical practitioners and 211 have been accepted by them, or if we add positive results, 591 have been accepted by them.

In all, 484 cases have been accepted by the Public Health Office, consisting of 18 cases before the test began, 380 cases giving a positive reaction and 32 cases giving a negative reaction, but contested, and 54 cases which died, or were not examined, during the period of the serum test.

The whole subject will be dealt with in a full and detailed report afterwards, but this summary will doubtless be expected as a preliminary to fuller treatment.

#### HISTORY OF ENTERIC DIRECT INFECTIONS.

Meantime, it will probably be considered sufficient if the manner is shown in which the test enters into the question of direct infection in Enteric Fever. This is in itself a subject of the greatest importance. The behaviour of Enteric Fever at private houses is entirely different from that which it displays at a well managed hospital, and the very common idea that Enteric Fever is not a directly infectious disease, or at all events not so in a high degree, is a most fallacious one. There is, perhaps, no disease in which more is to be expected from stringent precautions at home, from early diagnosis, and from prompt isolation in hospital. There is reason for believing that Enteric Fever has but slight power of infection in its earlier stages, or until a period of about 10 days has elapsed after the first symptoms of illness. The detailed statement of infections at home given last year clearly shows the magnitude of the danger, and a similar but fuller statement is here introduced in order to emphasise the necessity of prompt action, by the formation of an early diagnosis which can be made with the aid of the serum test, and by the adoption of prompt measures of precaution.

The history of what may be called immediate infections during 1897 is as follows. To these must, however, be added others, which will be specially considered.

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\* These include 35 cases not reported to the Medical Officer of Health.



# HISTORY OF INFECTION IN TYPHOID FEVER.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
1	F. 26 years, Daughter	1st November	M. 54 years	December 28	32 days	5	Not examined	First cases contracted at Dukinfield; then cases removed to hospital, but not at periods such as to avert infection.
	F. 20 years, Daughter	25th November	M. 13 years	December 31	35 days	6	do.	
2	F. 22 years, Sister ...	30th November	F. 20 years	January 6	37 days	11	do.	First case nursed at home. This patient was in the habit of going into the bedroom.
3	F. 23 years, Sister ...	16th December	F. 11 years	January 14	29 days	23	†	Second case died in Withington Hospital on January 25th, 1897; discovered in the death register. History cleared up by application of serum test.
4	F. 5 years, overlooked until 8 weeks after illness had commenced †	1st November. Illness lasted 8 weeks. Not reported. Diagnosed afterwards Bact. †	F. 21 years	January 1	62 days	30	†	
			F. 32 years	January 8	69 days	31	†	
			M. 8 years	January 11	72 days	...	...	
5	F. 3 years, Daughter, serum test † after recovery	1st January	M. 31 years	January 22	22 days	32	†	Attack of child, age 3 years, had been entirely overlooked. The serum test was applied, however, and a clear reaction obtained. Sister of male, æt. 31, had also been ill, but no reaction occurred on test being applied.
			F. 27 years	February 18	49 days	54	†	

† Signifies that the serum test gave a positive reaction.



# HISTORY OF INFECTION IN TYPHOID FEVER—continued.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
6	F. 13 years, Sister † Brother had fever in September, 1896, which appears to have been acute rheumatism	20th December	F. 23 years F. 17 years	February 5 February 19	47 days 61 days	42 55	† †	Referring to the opinion expressed as to the first illness, it is curious that the 4th attack was at first looked upon as one of "malignant endocarditis." Shown, however, to be enteric fever by serum test. Moreover, patient recovered.
7	M. 21 years †.....	24th January	F. 7 years	February 18	25 days	64	†	Nursing her husband at home.
8	M. 30 years, Husband	1st November, 1896	F. 30 years F. 2 years F. 4 years F. 6 years	February 22 March 1 March 1 March 20	114 days 121 days 121 days 140 days	70 72 74 99	† † † †	Children slept in the same room as parents. Husband had very prolonged illness. Recovery note sent on February 24th. Diarrhoea excessive.
9	M. æt. 3 years † ..... M. 5 years, Son †.....	12th December, 1896 24th December. These cases had been entirely overlooked. Discovered by serum test	F. 26 years	February 1	39 days	49	†	First cases overlooked. Both the first cases had suffered from copious diarrhoea, and were nursed by the mother. Here, again, the serum test cleared up the nature of the earlier attacks.

† Signifies that the serum test gave a positive reaction.

# HISTORY OF INFECTION IN TYPHOID FEVER—continued.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
10	F. 18 years, Sister †...	4th March	F. 15 years	March 20	16 days	94	†	This girl slept with her sister during her illness.
11	M. 14 years, Brother † F. 9 years, Sister †.....	13th March 15th March	F. 11 years	April 15	32 days	120	†	No clear statement as to infection.
12	F. 14 years, no relation†	9th March	F. 50 years Nurse	March 27	16 days	112	†	Nursed the first case from 16th to 27th March, when she went home ill. The first case (F. age 14) had been working at an establishment where other cases of Enteric were said to have occurred, and had partaken of raw mussels. Also, her mother had suffered from Enteric Fever at the same house six months before her illness.
13	F. 9 years, Sister †.....	18th March	M. 5 years	April	20 days	113	†	Possibly mediated through mother, who nursed first case.
14	M. 21, Brother † .....	12th April	M. 11 years F. 9 years F. 27 years	May 7 May 26 May 14	25 days 44 days 32 days	142 147 143	† † † †	No statement as to whether these children had been in the bedroom.

† Signifies that the serum test gave a positive reaction.

## HISTORY OF INFECTION IN TYPHOID FEVER—continued.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
15	M. 10 years, Brother to case, age 3	10th April	M. 27 years (a lodger) M. 3 years	May 2; June 4	43 days 55 days	152 155	— adheres † incomplete reaction	First case nursed by mother. Apparently the 2 subsequent cases were not directly exposed to infection from this case. The mother, however, prepared their food. Doubtful if Enteric.
16	M. 8 years, Brother. From sister whose case was overlooked	13th May	M. 10 years M. 19 years	May 20 July 10	7 days 58 days	160 175	† †	The sister Bertha was an over-looked case. No specimen could be obtained. The other children slept in the same room with Bertha while she was ill. The man 19 had also slept in the same room with the two younger brothers while ill.
17	M. 26 years, Husband†	20th May	F. 27 years	June 28	39 days	167	†	Wife, while nursing husband, took no disinfecting precautions.
18	Sister in Galway .....	Removed to hospital about 6th June	M. 22 years	June 22	Over a fortnight	...	†	Contracted at home in Galway.
19	M. 28 years, Father†	25th May	F. 5 years F. 3 years	July 22 July 28	58 days 64 days	187 188	† Not examined	The children, during the convalescence of the father, used to play about in the sick room frequently, get hold of the medicine glasses, &c., and put them to their mouths.

† Signifies that the serum test gave a positive reaction.



# HISTORY OF INFECTION IN TYPHOID FEVER—continued.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
20	F. 9 years, Daughter † F. 3 years, Daughter †	11th June 18th June	F. 28 years	July 17	36 days	177	†	The mother had nursed these two children.
21	M. 31 years, Brother	28th July	F. 20 years	August 8	11 days	194	No examination made	No history obtained.
22	F. 2 years, Daughter † F. 8 years, Daughter † F. 4 years, Daughter †	22nd August 29th August 29th August	F. 32 years	Sept. 16	25 days	255	†	The mother nursed these children.
23	F. 21 years, Daughter	8th August	M. 58 years	September 4	27 days	220	†	
24	M. 10 years, Son † ...	30th July	M. 45 years	September 11	43 days	261	†	Was in the custom of attending to the sick child without taking precautions, such as washing his hands.
25	M. 16 years, Son † ...	27th August	M. 43 years F. 8 years F. 11 years	September 11 September 19 September 30	15 days 13 days 34 days	302 260 278	† † †	First case overlooked, and cleared up by the application of the serum test early in October.

† Signifies that the serum test gave a positive reaction.

## HISTORY OF INFECTION IN TYPHOID FEVER—continued.

No	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
26	F. 11 years, severe case, died	31 August	M. 22 years	October 1	31 days	307	†	The first patient was nursed by an old housekeeper. Very little precaution was taken to prevent contamination of food during the nursing.  A case of Enteric Fever occurred next door about 6 months ago, and the stools were at first emptied into the midden. The drains of these houses have recently undergone reconstruction. The boy (second case) attended upon his mother, and no precautions were taken by way of disinfecting his hands.
			M. 16 years	October 3	33 days	308	+	
27	F. 37 years, Mother †	6th October	M. 13 years	October 19	13 days	335	†	
28	M. 10 years, Brother †	14th October	F. 6 years	November 6	23 days	362	†	During the time the boy was nursed at home, the mother could not keep this patient away from him.
29	M. 35 years, Husband †	30th September	F. 35 years	October 23	23 days	364	†	Occupied the same bed as her husband previous to his removal to hospital.†

† Signifies that the serum test gave a positive reaction.

# HISTORY OF INFECTION IN TYPHOID FEVER—continued.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
30	F. 44 years, Sister † ...	2nd October	M. 30 years	November 11	40 days	393	†	There were 28 days after the last exposure. Infection was probably intermediate through the soil or food.
31	F. 30 years, Wife † ... M. 10 years, Son † ... F. 9 years, Daughter †	20th November 23rd November 23rd November	M. 35 years	December 8	18 days	472	†	The first cases were probably from an overlooked case, who had been treated for Inflammation of the Lungs. This attack was in a boy æt. four, for whom a sample was asked, but not obtained.
32	F. 5 years, Sister † ...	15th November	F. 4 years	December 6	21 days	424	†	No report as to the conditions under which infection took place.
33	F. 11 years, Sister † ..	15th October	M. 15 years	November 27	43 days	425	†	Slept in the same room as the first patient previous to her removal to hospital. Took ill seven days' after removal of sister.
34	M. 11 years, Brother †	18th November	F. 4 years	November 29	11 days	430	†	No history of conditions. But from the description of the house the children must have slept together.

† Signifies that the serum test gave a positive reaction.



HISTORY OF INFECTION IN TYPHOID FEVER—*continued.*

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
35	F. 7 years, Brother †...	29th November	M. 2 years	December 14	15 days	455	†	The first cases were probably contracted from an overlooked case in the same house.
36	F. 13 years, Brother † M. 4 years, Brother † M. 5 years, Brother	7th December 7th November 30th October	M. 7 years F. 12 years	December 7 December 13	30 days 36 days	436 460	† †	A previous case, boy æt. five, was taken ill October 30th. On the notification of the later cases, a sample of blood was requested from this case, but none was sent. As there are only two rooms in this house, the children must have all slept in the same room.
37	F. 29 years, Mother †	17th November	F. 6 years	December 7	20 days	440	†	This child, along with her sister, attended to the mother before removal to the hospital.
38	M. 21 years, Brother †	24th October	M. 16 years	November 28	35 days	445	†	These brothers slept together until the illness of the first was well established.
39	F. 15 years, Sister †...	9th December	F. 6 years F. 2 years	December 19 December 19	10 days 10 days	467 491	† †	F. æt. 15 was } Children all dizzy & weak. } together in the F. æt. 2 had a } same bedroom. "cold." } It will be seen that the serum test was here of decided value.

† Signifies that the serum test gave a positive reaction.

# HISTORY OF INFECTION IN TYPHOID FEVER—continued.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
40	F. 16 years, Sister †...	9th November	M. 14 years F. 11 years	December 21 December 22	42 days 43 days	485 486	† †	The first case had been treated for Pneumonia, and was diagnosed Typhoid Fever by the serum test after the second and third cases had been reported. The presence of an overlooked case was surmised from the dates of attack of the later cases. No history of infective conditions ascertained.
41	F. 28 years, Mother †	24th November	F. 8 years	December 17	23 days	488	†	Mother's attack overlooked. Child would be in bedroom, but no statement made.
42	M. 11 years, Brother †	10th December	M. 16 years	December 25	15 days	490	†	No statement of conditions of attack. Brothers would certainly be in the same bedroom, as there were only two bedrooms.
43	M. 8 years, Brother †	27th December	M. 10 years	February 15	50 days	88	†	The first case was overlooked, and proved to be Enteric Fever by the serum test. Children much neglected, and no doubt slept together.

† Signifies that the serum test gave a positive reaction.

HISTORY OF INFECTION IN TYPHOID FEVER—*continued*.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
44	M. 48 years, Father †	23rd May	F. 16 years	May 26	3 days	151	†	Defective report. Possibly an earlier overlooked case occurred at this house.
45	M. 24 years, Temporary Lodger †	12th October	M. 21 years F. 15 years	October 7 October 7	... ...	314 315	† †	The first patient was no doubt ill some time before the 12th October, but he would not admit that he was. The opinion of the father of the second and third cases was that the lodger was ill on his arrival at the house on the 15th September. No serum test in the first case, which was no doubt one of Enteric.
46	M. 4 years, Son †.....	6th November	F. 31 years	November 9	3 days	385	†	Both patients ate a quantity of raw mussels about three weeks ago.
47	F. 37 years, Wife † ...	11th November	M. 39 years	November 18	3 days	408	†	Daughter, æt. 9 years, had inflammation of the Lungs about a month ago. The Medical attendant was asked to try the serum diagnosis, but this was not done, either for the daughter or the wife. The wife probably contracted the disease from the daughter.

† Signifies that the serum test gave a positive reaction.



# HISTORY OF INFECTION IN TYPHOID FEVER—continued.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
48	M. 11 years, Brother †	12th November	M. 13 years	November 19	7 days	417	†	Brother of these two patients, æt. 22 years, spent his holidays at the Isle of Man at the end of August, and complained of being unwell on his return. He states that he ate four oysters every morning before his breakfast. The serum test in his case gave no reaction.
49	Sister ?.....	...	M. 25 years lodger at this house	January 4th	...	9	Sent in as "Diphtheria." No examination. Monsall diagnosis, Enteric Fever.	Patient's sister, who visited him during the Christmas holidays, and was ill all the time during the visit, returned home to Bedfordshire. The patient's father has written to say his daughter is suffering from Enteric Fever.
50	F. 29 years. Work-mate †	17th April	F. 14 years	May 5th	18 days	132	†	The parents state that the second patient was in the habit of cleaning the closets at the mill where she was employed. The first patient was employed at the same mill.
51	Mother and sister (age 2) suffered from Diarrhœa	In June	M. 11 years	August 2nd	...	200	†	

† Signifies that the serum test gave a positive reaction.

HISTORY OF INFECTION IN TYPHOID FEVER—*continued*.

No.	First Case or Cases	Date of Commencement of Illness	Case or Cases reported	Date of Illness	Interval between Cases	Progressive number in Register	Bacteriological Examination of Cases reported	Special Remarks
52	Brother, æt. 19, returned earlier from the same house in Blackpool; probably had slight Enteric.	...	M. 16 years	August 25th	...	205	†	This patient commenced to be ill 10 days after a holiday at Blackpool. The patient's brother, who was there at the same time, has also had a slight illness, but the serum test could not be obtained.
53	Sister and Brother.....	.....	F. 13 years	September 25	.....	273	†	Sister of patient had a bad cold about a month ago, and brother about two weeks ago. The serum diagnosis was not obtained in these two cases.

† Signifies that the serum test gave a positive reaction.

From this statement it will be perceived that no fewer than 53 cases out of 484 could be traced to direct infection. If we add to these the cases occurring in Public Institutions, about one-seventh may be traced to immediate infection. This furnishes, I believe, a true picture of the disease as it behaves in large towns.

In the cases 4, 5, 9, 25, 40, 41, 43, the serum test was applied with the result of clearing up the nature of the first cases, which had been overlooked. In other instances it will be seen that a similar investigation would have been of value, but could not be obtained.

Particulars of more especial interest are those of three institutions in which outbreaks of Enteric Fever occurred.

In the first of these a number of boys were attacked with Enteric Fever during August and September, the outbreak coming to the notice of Dr. Mercer, who was then assisting the Medical Officer of Health in respect of infectious disease, in the first week of September.

All boys who had in any way been ill in such a manner as to suggest the possibility of Enteric Fever were, with two exceptions, submitted to the serum test, with the result of revealing the presence of 12 cases. Two were not examined, owing to pressure of work, making 14 cases in all.

The circumstances attending the outbreak were investigated by Dr. Mercer, and afterwards by myself, along with Inspector Hyslop. Although at one time there seemed a possibility that a strictly localised pollution of the water supply might have occurred owing to temporary defects in the supply, this was finally excluded. There was no case amongst the servants. All the 14 cases were amongst the boys.

These were divided into three sets—schoolboys, apprentices in the establishment shop, and situation boys, who go outside during the day. No case occurred among the schoolboys.

The boys' dormitories are on the first and second floors. Attached to each floor is a water-closet.

The second floor, with 61 beds, furnished only 3 cases, of whom, however, 2 occurred at the beginning of the outbreak. The first floor, with 62 beds, furnished 11 cases.

On each floor the closet adjoined a dormitory.

On both floors the closets were in a very bad condition, the floor being soaked with urine.



These closets were used by the boys on the respective floors at night. In the daytime they had trough closets in common. It would appear, then, that the day closets had little or nothing to do with the outbreak. On the other hand, a careful inquiry into all the details of the water supply and the changes therein, into the milk supply, into the arrangements for cooking and serving meals, into the foods used by the boys, their dressing arrangements, and every circumstance of their daily life of which one could think, failed to reveal anything which would explain why the boys on the first floor were attacked with Enteric, while those on the second floor were slightly affected, and why the officials and servants escaped entirely. Only in the existence and condition of the night closets was there any difference between the boys and the rest of the establishment; while the only circumstance in which the first floor boys differed from the second floor boys was the use of a separate closet. Both closets, it is true, were very defective. But mere deficiency without specific infection is not sufficient to produce disease. Once introduced, however, into a closet so misused as these closets were, infection had every opportunity to spread.

The capacity of the micro-organism of typhoid fever for spreading in foul soil and on polluted surfaces—which has been directly established by Dr. John Robertson and Dr. Sidney Martin, and about which indeed, except as determined or arrested by the presence of other micro-organisms, there could be no doubt—will probably occur readily on the fouled wall, seat, or floor of a dirty and infected closet, and the disease will thus be communicated. The probabilities are that the disease was imported into the institution by some overlooked case, and communicated by means of one of the closets which thus became infected. It would be impossible to ensure that the boys on the second floor did not sometimes use the first-floor closet, while those on the first floor would probably occasionally use the closet on the second floor. In that way the difference of incidence would be explained.

The serum test was here of the greatest value in enabling us to clear the disease completely out of the institution so far as the boys themselves were concerned, the reaction of the blood serum remaining for some time after convalescence perfectly sharp and distinct.

The incidence of the disease in this Institution is shown in the accompanying figures :—

LIST OF ALL CASES IN THE INSTITUTION, GIVING DATES OF ILLNESS AND DATES OF EXAMINATION, WITH RESULTS BY SERUM TEST.

Number of Patient	Progressive Number	Date of Illness	Date of Serum Test	Results of Examination
1	226	31st August	6th September	Positive reaction.
2	223	27th August	9th September	Positive reaction.
3	225	4th September	12th September	Positive reaction.
4	234	19th August	12th September	Positive reaction.
5	231	6th September	12th September	Positive reaction.
6	222	29th August	12th September	Positive reaction.
7	224	27th August	12th September	Positive reaction.
8	...	.....	13th September	Negative reaction.
9	246	12th September	13th September	Positive reaction.
10	243	19th August	13th September	Positive reaction.
11	247	15th September	14th September	Positive reaction.
12	...	.....	14th September	Negative reaction.
13	254	23rd August	17th September	Positive reaction.
14	250	18th August	21st September	Positive reaction.
15	...	.....	29th September	Negative reaction.
16	...	.....	29th September	Negative reaction.
17	...	.....	26th October	Negative reaction.
18	244	9th September	Not examined	.....
19	245	11th September	Not examined	.....

The second institution affected was one which employed nurses.

Two of these were attending on two patients in a small ward, and both contracted Enteric Fever. Inasmuch as no circumstance could be discovered in the daily life of these two nurses which separated them from the other nurses in the institution, and which linked them together, except the fact that they were in common attendance on these patients, it was thought advisable to have these patients examined by the serum test. One patient (case 3) gave a well-marked reaction.

She was accordingly removed to Monsall Hospital, and there died. A post-mortem examination was held, but no specific lesions of Enteric were discovered, though the Pyers patches were somewhat enlarged. I had not the opportunity of seeing the post-mortem personally.

The third nurse (case 4) had slept in the same bedroom with the first case previous to her removal to hospital, but had not nursed the patient (case 3).

The fifth case, a nurse had not been in contact with the nurses previously removed, but had nursed the patient (case 3) for two days six weeks previous to the commencement of her illness.



The sixth case had been in direct relation with the first case before removal to the hospital.

All these nurses had, however, access to a boxed-in water-closet, which was found to be leaking at the junction of the flush pipe with the closet pan, and it seemed possible that the wet floor might have become infected.

LIST OF ALL CASES IN THE INSTITUTION BACTERIOLOGICALLY EXAMINED,  
GIVING DATES OF ILLNESS AND DATES OF EXAMINATION, WITH  
RESULTS BY SERUM TEST.

Number of Patient	Progressive Number	Date of Illness	Date of Examination	Result of Serum Examination
1	398	22nd November	26th November	Positive reaction
2	405	28th November	30th November	Negative reaction
3	409	3rd December	7th December	Positive reaction
4	...	...	30th November	Positive reaction
			2nd December	Negative reaction. Not removed to Monsall
5	419	5th December	7th December	Positive reaction
6	477	25th December	28th December	Positive reaction
7	...	...	31st December	Negative reaction. Not removed to Monsall
8	15	2nd January	6th January	Positive reaction

The Third Institution.—At the end of 1897 and the beginning of 1898 a series of cases occurred at Monsall Hospital amongst the probationers. The Medical Superintendent was inclined to ascribe these attacks, in the case of some of the probationers, to a failure to carry out sufficient precautions in dealing with the infected clothing of the patients. That in the case of some of them such oversights did occur I have personally satisfied myself. Assuming that the disease was contracted by direct infection, these cases must be added to the 54 previously given.

It may be worth mentioning that on a previous occasion when a small outbreak in an institution similar to that in the second instance here mentioned came under my notice, exhaustive inquiry failed to elicit any link between the cases, except the possible one of dirty boxed-in closets. I am inclined, therefore, to lay considerable stress on rigorous cleanliness in closets. Certainly no closets in Public Institutions should be boxed in, and no dirt should be allowed to adhere to the seat or floor of the closet.

It is, perhaps, unnecessary to say that care has been taken to put right the condition of the conveniences found defective at the Institutions mentioned above.



## ON THE PERSISTENCE OF GROWTH OF THE BACILLUS OF ENTERIC FEVER IN THE SOIL.

In the Annual Report on the Health of Manchester for 1895, curves were given showing the variations in the number of cases of Enteric and Scarlet Fever and in the number of deaths from Summer Diarrhœa week by week. The number of cases occurring at any period is represented in these curves by the area intercepted between the curve, the base line, and vertical ordinates, and I, therefore, prefer the more simple way of representing the incidence to Buchan and Mitchell's method. Moreover, the larger waves of disease are thus more easily perceived. They show that each of these diseases has a well-marked seasonal wave, the crest of the Diarrhœa wave preceding that of Scarlet Fever, and the crest of the Scarlet Fever wave preceding that of Enteric Fever.

The curve of mean weekly temperatures, whether atmospheric, at a depth of 1 foot in the soil, or at a depth of 4 feet, bears a striking resemblance to the curves of disease.

Moreover, when observations of the amount of carbonic acid in the soil at a given depth are represented in the same manner, the curve showing the amount of carbonic acid is of the same form as the curve of temperature.

Now there can be no doubt that the variation in the amount of carbonic acid present in the soil is due to the growth of micro-organisms, which generate carbonic acid by their action on the materials contained in the soil, which act as pabulum to them. Many micro-organisms possess this property of generating carbonic acid, and the curve of carbonic acid thus affords no proof that any particular micro-organisms associated with a disease, the curve of which is in general accord with that of temperatures, undergoes growth in the soil, and is thereby propagated. Although, however, no proof is thus afforded for any particular disease, it is evident that there is a multiplication of micro-organisms in the soil of various kinds during the warmer season of the year.

Assuming, now, that the seasonal increase of any one disease is due to such growth, it would appear from the curves that the maximum growth in the soil, or at all events the maximum growth in those portions of the soil which are of such a nature and so situated as to lead to the extension of the disease, takes place at different periods for different diseases. This is only what we might expect in these low forms of vegetable life from the great variations in season of the higher plants, as well as from what we know of the particular micro-organisms. In respect, now, of the micro-organism special to Typhoid Fever, we know that it has great adaptability for growth in organic

solutions, and many outbreaks of the disease have indicated the influence of fouled soil in its propagation. It was, therefore, reasonable to suppose that the late autumnal upgrowth of the disease is due to the growth of the micro-organism in the soil favoured by the high temperature of the soil in autumn and by the washings from decaying vegetation. In attempting to explain the great amount of untraced Enteric, attention has been called by me to the probability of such growth taking place, and to the danger of spreading crude manure on the gathering grounds of water supplies. No proof, however, beyond general experimental knowledge was afforded that such growth does take place in the soil under the influence of decaying vegetable, of fæcal, and of other favouring materials.

This proof has now been afforded by the recent investigations of Dr. John Robertson of Sheffield, of Dr. Sidney Martin, and of other observers.

Dr. Robertson has proved that the bacillus of Typhoid Fever has great persistence of vitality in the soil, and that it is capable of growing to the surface in patches. Dr. Sidney Martin has proved that the character of the soil in which it grows is of much importance, the bacillus thriving in foul soils.

We may infer that such growth is especially liable to come to the surface of the ground in the neighbourhood of defective pails, where the destructive action of light on the micro-organisms cannot occur, and that as the ground dries in autumn, detachment may take place from the ground of the infective micro-organisms. It must be remembered, however, that such growth may equally take place on the fouled and wetted under-surface of a closet seat.

If we assume that we know the specific organism of Summer Diarrhoea, and there is good reason for believing that we do, practically the same holds good for that disease, though it would appear not to possess the virulence of the micro-organism of Typhoid Fever when carried by water, in dilution, or else, perhaps, to be more susceptible to the injurious effects of a low temperature than that micro-organism.

The suggestions derived from the correspondence between the curves showing the incidence of these diseases and the curves showing mean temperatures—that Enteric Fever and Summer Diarrhoea are diseases the infective matter of which grows in the soil, and that their transmission, though it may occur in other ways, particularly in the case of Enteric Fever, is annually reinforced from this source—are thus justified by the results of recent research.

By this circuitous route we come to the view that Scarlet Fever is, in all likelihood, in the same category, and it is possible that Diphtheria also will be shown to be one of the same group of diseases.



As regards Scarlet Fever, special reasons have been given in former reports why we should adopt this view.

The condition of the ground, then, assumes immense importance whether in the neighbourhood of inhabited houses, or in any position from which water or, it may be added, milk is derived.

The ground in the neighbourhood of houses may be fouled in various ways by defective privies and closets, by defective yards and back passages, by defective drains, and by collections of manure.

Any defect in the drains or pollution of the soil may be expected to be particularly dangerous when this occurs in connection with privies or closets—or in connection with slaughter-houses.

As regards water supply, I do not propose to consider this subject, except to point out that in certain contingencies the presence of defective water-pipes in fouled soil may lead to the propagation of Enteric Fever, and might thus, to some extent, defeat the best arrangements in respect of gathering grounds and distribution.

As regards the effect of privies in the propagation of Enteric Fever, the Eccles case deserves especial mention.

As a result of 16 cases of Typhoid Fever in nine houses in one street in the borough of Eccles during 1896, a special report was presented by Dr. Crocker, the Medical Officer of Health to the Sanitary Authority, pointing out that in every case the sanitary conveniences consisted of double privy pits—of the usual construction in this part of the country.

An order to substitute water-closets and ashtubs was made in each case, and this not being complied with by an owner of five of the houses, he was summoned before the Magistrates, who made an order on the lines of that of the Sanitary Authority. The owner appealed to the Court of Quarter Sessions, and the trial came off on January 12th, 1898.

At that trial, it was given in evidence that matter had been removed from between the bricks at the sides and floor of two of the pits, and submitted to bacteriological examination by Professor Delépine, who, by a special method, demonstrated the presence of typhoid bacilli in both samples.

This matter, then, was infected, and that although the privies had been systematically emptied and treated with chloride of lime subsequent to the notification of the cases, and although 13 months had elapsed since the notification of the last case.

This case is of great interest, both as showing the persistent vitality of the infection of Typhoid Fever, and as showing the powerful aid which a skilful bacteriologist can afford to Health Authorities.\*

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\* "Public Health," February, 1898.





It will be seen that from August onwards the ratio of middens to pails found in association with cases of Enteric Fever exceeds considerably the proportion of 1 to  $3\frac{1}{2}$ , which may be taken as that of the total number of middens to the total number of pails in the City. For the months immediately preceding, the ratios were 1 to 14 and 1 to 15.

The unvarying character of this relation year by year is both striking and conclusive. The ratio of Enteric middens to Enteric pails throughout 1897 exceeds the normal ratio of 1 to  $3\frac{1}{2}$ . But this is by no means uniformly the case for other years. In fact there can be no doubt that both middens and pails contribute to the propagation of the disease, though in different ways.

The figures showing the relation of pails, middens, and water-closets to cases of Enteric Fever are as follows :—

#### PAIL-CLOSETS WITH A GUIDE.

Adjoining the House		Within Four Feet		Over Four Feet Away	
Ground dry 132	Ground wet 5	Ground dry 9	Ground wet 2	Ground dry 112	Ground wet 1
137		11		113	
Total..... 261					

#### PAIL-CLOSETS WITHOUT A GUIDE.

Adjoining the House	Within Four Feet	Over Four Feet Away
14	1	20
Total..... 35		

#### MIDDEN CLOSETS.

Adjoining the House	Within Six Feet	Over Six Feet Away
27	24	62
Total..... 113		

#### WATER-CLOSETS—75

Of which 3 are in conjunction with pails or middens.

It is to be observed that, as with Scarlet Fever, the number of defective conditions in pail-closets appears to have considerably diminished.

Further, the number of cases associated with water-closets has greatly increased. To this result the histories already given under infection have very materially contributed. But there has also been a considerable increase of water-closets. Care must be exercised in the selection of a suitable type of water-closet, and in safe-guarding the conditions under which it is inserted in or near a building ; but I must, at the same time, express the opinion that the present condition of privy accommodation is disastrous to the public health.

PERSISTENCE OF THE INFECTIVE MATTER OF ENTERIC FEVER  
IN THE SOIL.

I have endeavoured to approach the subject of the persistence of Enteric Fever in the soil in another manner, viz., by ascertaining to what extent recrudescences of the disease occur in the same house. I have therefore had the records of the office examined, and those houses excerpted in which multiple occurrences have taken place from 1891 to 1897 in different years.

The result is shown in the following table :—

ENTERIC FEVER.

CASES RECURRING IN THE SAME HOUSE AFTER SOME TIME.

Address	Date of Onset			Closet
	First Case	Second Case	Third Case	
21, Ash Street, Ancoats	6th Oct., 1892	26th Aug., 1893	18th Jan., 1897	P. Adj.
172, Ashton New Road, Beswick	2nd Jan., 1894	24th Oct., 1896	27th Nov., 1897	P. Adj.
130, Bennett Street, Ardwick	7th Nov., 1892	18th March, 1895	.....	P. 8 feet
10, Broughton Street, Ancoats	10th July, 1892	9th March, 1897	.....	P. 9 feet
80, Birch Street, West Gorton	14th Nov., 1890	4th Oct., 1893	.....	M. 3 feet
"Travellers' Rest," Briscoe Lane, Newton Heath	23rd Sept., 1892	10th June, 1895	.....	P. 9 feet
3, Brackley Street, Hulme	10th Oct., 1891	13th Jan., 1896	.....	P. Adj.
9, Baslow Street, Beswick	9th Dec., 1891	22nd April, 1895	.....	P. 15 feet
14, Branson Street, Ancoats	2nd June, 1892	17th April, 1897	.....	P. 10 feet
14, Bell Street, Cheetham	22nd Feb., 1893	17th Sept., 1894	.....	P. 10 feet



ENTERIC FEVER—CASES RECURRING IN THE SAME HOUSE AFTER SOME TIME—*continued.*

Address	Date of Onset			Closet
	First Case	Second Case	Third Case	
4, Britannia Street, Openshaw	20th April, 1893	31st Jan., 1897	.....	M. Adj.
3, Bernard Street, Harpurhey	19th April, 1895	19th Aug., 1896	.....	M. 9 feet
29, Corporation Street, Ardwick	25th Mar., 1890	9th Sept., 1895	.....	P. Adj.
23, Clarendon Street, C.-on-M.	1st May, 1891	10th Feb., 1893	.....	P. Adj.
19, Clopton Street, Hulme	27th Sept., 1892	9th Dec., 1897	.....	P. Adj.
4, Cross Street, Central	23rd Jan., 1896	24th Dec., 1897	.....	P. 14 feet
15, Lancaster Street, Hulme	8th Jan., 1890	20th Jan., 1892	.....	P. Adj.
10, Ludgate Hill...	10th Jan., 1890	4th May, 1895	.....	W.C. recon.
34, Lord Street, Openshaw	2nd Dec., 1890	18th Jan., 1895	.....	P. 10 feet
6, Larch Street, Cheetham	23rd Nov., 1891	21st Oct., 1893	.....	P. 4 feet
62, Lloyd Street, C.-on-M.	13th July, 1893	3rd Sept., 1895	.....	P. Adj.
343, Mill Street, Bradford	16th Nov., 1893	21st Nov., 1895	.....	P. 3 feet
14, Moreton Street, Cheetham	4th Oct., 1890	9th June, 1896	.....	P. 4 feet
18, Marsden Street, Newton	17th Nov., 1892	22nd Oct., 1897	.....	P. 5 feet
24, Moody Street, Bradford	21st June, 1894	24th May, 1897	.....	P. Adj.
60, Owen Street, Hulme	29th Oct., 1895	5th Oct., 1896	.....	P. Adj.
606, Oldham Road, Newton	4th Jan., 1892	11th Nov., 1894	.....	M. 2½ feet
8, Oram Street, St. George's	16th Feb., 1891	18th July, 1893	.....	P. Adj.
18, Pump Street, St. George's	12th Nov., 1891	5th Aug., 1895	.....	P. 60 feet
103, Percival Street, St. George's	17th Nov., 1894	4th Oct., 1895	.....	P. 5 feet
8, Park Street, Cheetham	25th July, 1892	10th Nov., 1893	.....	P. Adj.
9, Ross Street, West Gorton	29th Oct., 1892	21st Oct., 1895	.....	M. 9 feet
128, Radnor Street, Hulme	7th Feb., 1890	23rd May, 1892	.....	P. Adj.
243, Radnor Street, Hulme	13th Aug., 1890	23rd Nov., 1894	.....	P. Adj.
6, Rae Street, Hulme	10th Oct., 1891	1st Jan., 1893	.....	P. Adj.
60, Renshaw Street, Hulme	4th Sept., 1892	17th Nov., 1894	.....	P. Adj.
104, Rutland Street, Hulme	5th Oct., 1894	1st Feb., 1896	.....	P. Adj.

ENTERIC FEVER—CASES RECURRING IN THE SAME HOUSE AFTER SOME TIME—*continued.*

Address	Date of Onset			Closet
	First Case	Second Case	Third Case	
8, Ravensdale Street, Rusholme	14th Oct., 1894	26th Sept., 1895	.....	P. 5 feet
1, Duke Street, Ancoats	14th Jan., 1890	13th Feb., 1892	.....	P. 1 foot
8, Dumville Street, Central	22nd Aug., 1890	9th Jan., 1894	.....	P. 3 feet
25, Durham Street, Newton	23rd May, 1895	4th Nov., 1896	.....	P. 6 feet
13, Durham Street, Harpurhey	28th July, 1892	13th July, 1893	.....	M. Adj.
13, Ellesmere Street, Hulme	26th Nov., 1890	8th Feb., 1894	.....	P. 38 feet
25, Freeman Street, Hulme	4th Nov., 1891	10th March, 1892	.....	P. Adj.
87, Gibson Street, Ardwick	17th Nov. 1891	30th Jan., 1893	.....	P. Adj.
23, Gorton Road, Openshaw	4th Sept., 1893	2nd May, 1894	.....	M. Adj.
26, Gardner Street, West Gorton	3rd March, 1891	28th Oct., 1893	.....	M. 8 feet
18, Gorton Place, West Gorton	19th Oct., 1891	25th Sept., 1897	.....	M. Adj.
27, Hope Street, Ardwick	28th Aug., 1890	12th April, 1891	.....	P. Adj.
297, Hyde Road, Ardwick	8th April, 1890	15th April, 1891	.....	M. Adj.
319, Hyde Road, Ardwick	About 5th Dec., 1890	1st April, 1893	.....	W. C. Adj.
10, Howard Street, Hulme	13th Oct., 1895	31st Dec., 1897	.....	P. Adj.
2, Holland Street, Ancoats	6th Nov., 1891	24th July, 1896	.....	P. 6 feet
6, Hastings Street, C.-on-M.	22nd March, 1893	27th March, 1897	.....	P. Adj.
35, Halsburg Street, West Gorton	4th Aug., 1893	31st Aug., 1896	.....	M. Adj.
62, St. Oswald's Grove	21st Sept., 1892	7th June, 1896	.....	P. Adj.
30, South Street, West Gorton	6th March, 1891	16th Aug., 1894	.....	M. Adj.
30, Shrewbridge Street, West Gorton	9th Oct., 1891	14th Oct., 1896	.....	M. 6 feet
263, South Street, Openshaw	5th Nov., 1893	3rd Nov., 1897	.....	P. 11 feet
29, Stott Street, Hulme	10th March, 1893	3rd Oct., 1896	.....	P. 3 feet
5, Singleton Street, Ancoats	14th Sept., 1892	3rd June, 1897	.....	P. Adj.
14, Smith Street, Central	31st Oct., 1895	22nd May, 1896	.....	P. Adj.
27, Thomas Street, West Gorton	18th Dec., 1891	24th Nov., 1894	.....	M. 7 feet

ENTERIC FEVER—CASES RECURRING IN THE SAME HOUSE AFTER SOME TIME—*continued*.

Address	Date of Onset			Closet
	First Case	Second Case	Third Case	
90, Thomas Street, West Gorton	3rd May, 1891	24th July, 1895	.....	M. 9 feet
88, Thomas Street, West Gorton	1st Dec., 1892	30th Oct., 1895	.. ...	M. 9 feet
164, Thomas Street, West Gorton	19th Oct., 1893	23rd Nov., 1894	.....	M. 7 feet
42, Thomas Street, West Gorton	31st Aug., 1895	26th Jan., 1897	.....	M. 9 feet
3, Tunstall Street, Beswick	15th Aug., 1893	7th Nov., 1893	.....	P. 8 feet
70, T a m w o r t h Street, Hulme	20th May, 1895	11th Oct., 1896	.....	P. Adj.
10, Tyndall Street, Ardwick	1st Oct., 1892	7th Sept., 1895	.....	P. Adj.
21, Tomlinson Street, Bradford	26th Dec., 1891	16th Aug., 1895	.....	M. 9 feet
23, Trafford Street, Hulme	18th Oct., 1892	18th Jan., 1895	.....	P. Adj.
74, Wilmott Street, Hulme	30th Jan., 1890	21st Dec., 1894	.....	P. Adj.
91, Wilmott Street, Hulme	16th Dec., 1893	24th June, 1894	.....	P. 6 feet
75, Whitworth Street, Openshaw	7 Dec., 1890	29th Oct., 1894	.....	P. 12 feet
39, William Street, West Gorton	30th Nov., 1890	1st Dec., 1897	.....	M. Adj.
4, Welton Place, Rusholme	24th Nov., 1890	12th April, 1891	.....	M. 30 feet
25, W o o l l a m ' s Place, Central	29th Nov., 1895	1st Oct., 1897	.....	P. Adj.

This table shows, in the first place, that recurrences are as liable to take place in houses provided with pails as in houses provided with middens. It will be seen that recurrences are, however, especially frequent in West Gorton, where the closets are mostly of the midden type.

Now in order to see what is the measure of persistence, we must have some conception of what amount of recurrence we may naturally expect.

This we may obtain very roughly as follows. We assume that all the houses in the City are equally liable to invasion. Then, excerpting the average number of houses affected once in the seven years, the chance of any one house being affected in any one year is

$$x = \frac{\text{Average number of houses affected.}}{\text{Average number of occupied houses.}}$$



Let  $m$  be the number of years over which the inquiry extends. The chance of any house being affected in two different years is  $\frac{x^2 m (m-1)}{2}$ , and the

chance of a house being thrice invaded in separate years is  $\frac{x^3 m (m-1) (m-2)}{6}$ .

The number of houses which we should expect to be invaded on these suppositions is :—Affected twice,  $\frac{x^2 m (m-1)}{2} \times$  average number of occupied houses in the City ;

affected thrice,  $\frac{x^3 m (m-1) (m-2)}{6} \times$  average number of occupied houses in the City.

$$\text{Now } x = \frac{490}{106,721} \text{ and } m = 7.$$

$$\text{Hence } \frac{x^2 m (m-1)}{2} \times \text{average number of houses} = 47.2$$

The actual number twice invaded is 78. The excess of actual over the calculated recurrences is thus 31, or if we reckon the two double recurrences, 33.

$\frac{x^3 m (m-1) (m-2)}{6} \times \text{average number of houses} = 0.35$ , while the actual number of recurrences three times is 2. It will be seen, then, that there is an excess of actual recurrences, but not a great and striking excess. It may be doubted, however, whether the persistence is to be looked for so much in the house itself as in neighbouring houses, assuming that it is due to growth of infective matter in the soil outside the house.

Then, moreover, we should perhaps expect the excess to be more marked if we take successive years.

The expectation of recurrence in successive years, the number of the years being seven, is  $6 x^2$ , and the number of such expectation recurrences is 13.5. The number of actual recurrences is 20. Here also, then, there is an excess of the actual over the expectation recurrences.

The facts would probably yield more evidence if examined in a more elaborate manner. Thus, for example, the list of recurrences shows a special tendency to recurrence in West Gorton, and a separate calculation for that district would probably yield more evidence of persistence. On the other hand, the calculation will not stand small figures, being essentially of a rough character, and subject to material deductions on the ground of doubtful diagnosis.

Thus, in whatever manner we approach this question, we find that there is evidence of the persistence in contaminated soil of the infective matter of Enteric Fever when it has once been introduced.

## ENTERIC FEVER AND SHELL-FISH.

The evidence for 1897 of connection between the consumption of raw shell-fish and the occurrence of Enteric Fever will be seen from the following list not to be very great:—

## ENTERIC FEVER, 1897.

Shell-fish Eaten Raw	Period before Illness	If Partaken of by other Members of the Family	No. of Case	Remarks
Oysters and mussels ...	About 12 days	No	39	...
Oysters .....	14 days	No	44	...
Oysters .....	...	No	67	Patient was in the habit of calling almostly nightly at a shop in Openshaw, and eating large quantities of oysters
Oysters .....	...	No	119	Patient has been in the habit of eating two raw oysters to supper every night for the last six months.
Oysters .....	17 days	Yes	176	Father, mother, and patient had each one raw oyster from a man on the sands at Black-pool
Oysters .....	10 days	?	205	...
Oysters .....	14 days	Yes	257	...
Oysters .....	18 days	No	296	...
Oysters .....	13 days	No	320	...
Mussels .....	7 days	No	331	...
Mussels .....	22 days	Yes	347	...
Mussels .....	21 days	Yes	370	...
Mussels .....	8 days	Yes	389	...
Mussels .....	1 month	No	407	...
			and	...
			408	...
Mussels .....	3 weeks	Yes	433	...

The following are the usual tables with regard to Enteric Fever :—

ENTERIC FEVER ATTACKS, 1897.

DISTRICTS OF MANCHESTER	ATTACKS	ATTACK RATE PER 1,000 LIVING	† CASE FATALITY, PER CENT.	REMOVALS TO HOSPITAL, PER CENT.
Ancoats .....	40	0·87	17·5	62·5
Central .....	32	0·88	25·0	84·4
St. George's .....	46	0·72	21·7	71·7
Cheetham .....	32	1·03	3·1	56·2
Crumpsall .....	6	0·63	...	50·0
Blackley .....	11	1·37	36·4	54·5
Harpurhey .....	10	0·84	10·0	40·0
Moston .....	8	1·22	37·5	25·0
Newton Heath .....	40	1·08	22·5	62·5
Bradford .....	20	0·87	35·0	40·0
Beswick .....	8	0·74	12·5	75·0
Clayton .....	3	0·73	...	33·3
Ardwick .....	32	0·85	18·7	50·0
Openshaw .....	55	1·79	16·4	58·2
Gorton (West) .....	41	1·48	7·3	65·8
Rusholme and Kirk...	9	0·46	33·3	11·1
Chorlton-on-Medlock..	42	0·68	16·7	47·6
Hulme .....	68	0·95	16·2	60·3
<b>City of Manchester.</b>	<b>503</b>	<b>0·94</b>	<b>17·9</b>	<b>58·6</b>

† Corrected ; the fatal cases are those occurring amongst the cases actually notified.

ENTERIC FEVER ATTACKS IN WEEKS ACCORDING TO DATE OF ONSET.

1897.

FIRST QUARTER		SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER	
Jan. 9	10	April 10	5	July 10	4	Oct. 9	16
„ 16	10	„ 17	10	„ 17	3	„ 16	17
„ 23	7	„ 24	3	„ 24	6	„ 23	11
„ 30	5	May 1	2	„ 31	5	„ 30	12
Feb. 6	10	„ 8	3	Aug. 7	3	Nov. 6	13
„ 13	5	„ 15	5	„ 14	8	„ 13	18
„ 20	8	„ 22	3	„ 21	7	„ 20	12
„ 27	7	„ 29	9	„ 28	17	„ 27	20
Mch. 6	11	June 5	1	Sept. 4	20	Dec. 4	21
„ 13	6	„ 12	4	„ 11	12	„ 11	20
„ 20	8	„ 19	3	„ 18	13	„ 18	17
„ 27	6	„ 26	3	„ 25	19	„ 25	23
April 3	4	July 3	6	Oct. 2	20	Jan. 1'98	12
Total...	97	Total...	57	Total...	137	Total...	212

City Total ... .. 503



1897.—ENTERIC FEVER SICKNESS.—RATE PER 1,000 LIVING.

	1892	1893	1894	1895	1896	Mean	1897
Twelve Notification Towns...	0·90	1·85	1·32	1·45	1·38	<b>1·38</b>	1·32
<b>City of Manchester</b> .....	1·19	1·19	0·88	0·94	0·95	<b>1·03</b>	0·94
Manchester Township.....	1·18	0·93	1·04	0·70	0·88	<b>0·95</b>	0·81
North Manchester .....	0·94	1·08	0·73	0·98	1·11	<b>0·97</b>	0·97
South Manchester .....	1·33	1·42	0·86	1·06	0·91	<b>1·12</b>	0·99

ENTERIC FEVER, 1897.

AGES	ATTACKS	DEATHS	CASE FATALITY, PER CENT.
Under one year.....	...	...	...
1 to 2 years .....	1	1	100·0
2 to 3 „ .....	6	...	...
3 to 4 „ .....	7	1	14·3
4 to 5 „ .....	11	1	9·1
5 to 6 „ .....	15	2	13·3
6 to 7 „ .....	13	1	7·7
7 to 8 „ .....	14	1	7·1
8 to 9 „ .....	13	2	15·4
9 to 10 „ .....	17	3	17·7
10 to 15 „ .....	90	10	11·1
15 to 20 „ .....	91	13	14·3
20 to 25 „ .....	60	11	18·3
25 to 30 „ .....	96	20	20·8
35 to 45 „ .....	47	14	29·8
Over 45 „ .....	22	10	45·4
All ages.....	503	90	17·9

PERCENTAGE OF DEATHS IN CASES OF ENTERIC FEVER AT  
DIFFERENT AGES, 1891-92-93-94-95-96-97.

AGES	ATTACKS	DEATHS	CASE FATALITY
Under one year.....	6	4	66·7
1 to 2 years .....	22	7	31·8
2 to 3 „ .....	47	7	14·9
3 to 4 „ .....	66	16	24·2
4 to 5 „ .....	109	12	11·0
5 to 6 „ .....	119	16	13·5
6 to 7 „ .....	110	12	10·9
7 to 8 „ .....	110	13	11·8
8 to 9 „ .....	117	8	6·8
9 to 10 „ .....	114	13	11·4
10 to 15 „ .....	650	78	12·0
15 to 20 „ .....	700	138	19·7
20 to 25 „ .....	569	111	19·5
25 to 35 „ .....	662	183	27·6
35 to 45 „ .....	340	121	35·6
Over 45 „ .....	217	88	40·5
All ages .....	3,958	827	20·9

1897.—MORTALITY FROM ENTERIC FEVER —RATE PER 1,000 LIVING.

	1892	1893	1894	1895	1896	Mean	1897
England and Wales .....	0·14	0·23	0·16	0·17	0·17	<b>0·17</b>	0·16
London.....	0·10	0·16	0·15	0·14	0·13	<b>0·14</b>	0·13
Dublin .....	0·38	0·80	0·42	0·29	0·45	<b>0·47</b>	0·58
<b>City of Manchester</b> .....	0·24	0·25	0·17	0·18	0·22	<b>0·21</b>	0·18
Manchester Township .....	0·24	0·18	0·23	0·18	0·28	<b>0·22</b>	0·17
North Manchester .....	0·25	0·27	0·14	0·16	0·18	<b>0·20</b>	0·20
South Manchester .....	0·24	0·27	0·16	0·19	0·20	<b>0·21</b>	0·17

ON THE IMPORTANCE OF SOIL IN THE PRODUCTION OF THE DISEASE.

In an address to the Midland Medical Society, published in *The Lancet* of November 6th, 1897, Sir R. Thorne Thorne, Chief Medical Officer to the Local Government Board, considers the influence of soil in reference to the production of infectious disease. It is true he uses the word soil not only in the more limited sense of the ground, but also in reference to the human frame itself. In the remarks which I would place before you, however, his observations have reference particularly to the ground in association with Typhoid Fever.

Referring to investigations made by Dr. Sidney Martin for the Local Government Board, he says :—

“ Dr. Sidney Martin made one set of experiments with soils containing a large quantity of organic matter, some of these being derived from localities where Enteric Fever was wont to recrudesce from time to time. Having placed samples of these soils in flasks, and having completely sterilised them, he inoculated them with one and another culture of the typhoid bacillus, and examination of soils thus treated at intervals varying from about a fortnight to fifteen weeks showed that the bacilli had invariably retained their vitality ; that in some cases the whole, and in others a part only, of the experimental soil had become pervaded by diffused growth of the bacilli ; and that the extension of the growth bore relation to the temperature at which soil of this class was incubated, and also to the amount of moisture in the experimental soil. The important conclusion is, however, reached that under the conditions of a laboratory experiment soil such as that described affords, after complete sterilisation and at ordinary temperatures of the atmosphere, not only a medium in which the typhoid bacillus can retain its vitality, but one on which it is capable of multiplication and of spreading abroad. In the official report referred to, Dr. Sidney Martin only records the results of his experiments up to the end of March last, when his experience in this matter was limited to



105 days, or fifteen weeks; but his further investigations into this subject have already shown that in a soil such as that referred to, the retention of vitality and the power of spreading abroad of the typhoid bacillus have been maintained at varying temperatures for periods of no less than 214 and 268 days—that is to say, some seven and nine months.

“Dr. Martin next proceeded to make similar experiments with two soils of quite different sorts. One was a firm, crumbling, peaty soil, and the other a red sandy soil from beneath the peat, both being collected at a distance from human habitations. These so-called “virgin” soils were first sterilised, and then they were inoculated with culture of the typhoid bacillus in precisely the same way as had been practiced with the organically polluted soils. Some samples were then inoculated at the temperature which had been found in earlier experiments to be most favourable to the growth of the bacillus in soil, other samples being kept at the ordinary temperature of the laboratory. The result was in striking contrast with that of the experiments carried out with the organically contaminated soil. In all the previous testings the typhoid bacillus had retained its vitality from the first, and in most of them there had been spread of the micro-organism from the centre of the soil, where the original inoculation had been made, to the periphery. But with both sets of these virgin soils no sign whatever of vitality could be discovered as the result of testings fourteen, twenty, and twenty-three days after the inoculations.

“Thus far these experiments have only been carried out under laboratory conditions; they have had concern only with the vitality of the organism in its vegetative aspects; they have been carried out with sterilised soils, that is to say, soils where the typhoid bacillus was free from the influence—whether favourable or inimical—of other micro-organisms in the soil; therefore they will have to be repeated on a wider scale and under circumstances more nearly resembling those met with in nature, and they must take cognisance, not only of the vegetative properties, but also of the physiological and pathogenic properties of the organism. But in the meantime they are of marked value in connection with the question to which I am addressing myself, and they may serve to teach some useful lessons. Speaking always with a due sense of the restrictions imposed by the artificial character and the limited number of the experiments thus far reported on, I may fairly maintain that we have reason for inferring that whilst one soil and set of circumstances are highly favourable to the vitality and propagation of the typhoid bacillus, another soil and set of circumstances are rapidly destructive to it; and we seem to be upon the border of a territory where some vein of actual knowledge is likely to be discovered which will materially assist, not only in solving the problem of the different behaviour of Enteric Fever as regards its persistence and recurrence in one and another dwelling, town, or district, but of further emphasising the value of that practice which has now so long been adopted in this country for the prevention of Typhoid Fever.



“In order to give a practical aspect to this question, let me recall some of the circumstances of the soil and surroundings, which we have learned by experiment to be favourable to the vitality and multiplication of the typhoid bacillus. They are that the soil should be pervious, that it should be permeated with a sufficiency of decaying—preferably animal—organic matters, that it should possess a certain amount of moisture, and that it should be subject to a certain temperature. And then let us consider what means can be adopted to deprive the soil of one or more of these conditions which appear to favour the retention of the vitality and power of multiplication of the typhoid bacillus, and to prevent that organism from gaining access to the soil in the neighbourhood of human dwellings. To this end, I would in the first place advocate the paving of open spaces about dwellings where these open spaces are of small area, and are liable to become contaminated with excreta. In this way fouling of, as well as penetration by a pathogenic micro-organism into, the underlying soil is practically prevented. Indeed it is well known, not only that the paving of yards about small cottage and tenement property in towns has in its results been shown to be a public health measure of first importance, but also that the value of such a measure has depended largely on the use of a form of pavement which really ensures impermeability. In the next place, it will be clear that organic and decaying refuse should be so dealt with as to prevent its contaminating the soil in the neighbourhood either of dwellings or of sources of water supply. I need hardly point out here in detail what are the points to aim at in securing this end; but I may perhaps usefully approach the matter from the other point of view, and say that the midden-privy which still prevails in so many of our large midland and northern towns presents every feature that should studiously be avoided. Generally sunk below the surface of the ground, often open to rainfall, always storing up decomposing excreta and refuse in close proximity to dwellings, it provides almost every condition favourable to the production of nuisance, to the saturation of soil with filth, and to the setting up and maintenance of those very conditions which seem to be essential to the vitality and multiplication of the typhoid bacillus. The fact that with our present knowledge such a structure as the common midden-privy should not only still exist in our midst, but be clung to with a perverted tenacity, is in my opinion the greatest blot which attaches to English sanitary administration at the close of the nineteenth century. Apart from its sanitary aspect, it is a system as degrading and ignoble as it is foul, and I trust the day is not far distant when we shall look back to it as a barbarism of the past. Firstly, then, let our aim be to maintain such a condition of cleanliness about our houses that the soil shall approach as far as practicable to the condition of those virgin soils which are inimical to the growth of the pathogenic organism under consideration.

“The next points are to deprive the soil in the immediate proximity of dwellings and of wells, so far as this may be practicable, of those conditions of moisture and temperature which we begin to perceive may tend most to the multiplication of the Enteric Fever organism. We have as yet but little precise information on these points; but if we may judge by the very partial and as yet incomplete experiments made by Dr. Sidney Martin in this matter, we are led to the conclusion that a porous and organically contaminated soil to which moisture in the form of distilled water has been added to the extent of some 35 grammes per cent., and having a temperature of some  $37^{\circ}$  C. ( $103^{\circ}$  F.), seemed best adapted to the growth and the spreading abroad of the typhoid bacillus. Any material modification in the amount of moisture, and, above all, any reduction of the temperature down to that which may ordinarily be expected in soil, tended at once to retard and to check the growth of this bacillus. In so far, then, as we may be able to control conditions of temperature and moisture in the soil in the immediate neighbourhood of groups of dwellings, to that extent we may be able to acquire some control over recurrences of Enteric Fever. Here, again, I would give prominence to the systematic paving of house yards with an impervious material. Where open spaces about dwellings are large, and where organic pollution of surface soil is practically absent, we may rely, as inhibitive of this bacillus, on the influence of sunlight and of alternating weather; but in our towns the conditions have become too artificial, and the open area about dwellings has become too restricted, for us to hope that under the unnatural conditions which have been induced by urban aggregations of dwellings we have any right to expect the full benefit of nature's remedies.”

Referring again to the connection of soil with Summer Diarrhœa, he uses these words of counsel:—

“Let us again seek some practical application of the results of this research. First and foremost stands the need of a soil that shall be maintained as free as practicable from organic contamination; and in the narrow and restricted open spaces about our city dwellings, this means such disposal of excreta as shall be free from nuisance, such means of storage of all domestic refuse in receptacles of limited capacity as shall prevent contamination of soil and air, and shall necessitate frequent, even daily, removal; and, once more, it means the provision of an impervious paving for yards and courts, so as to protect the soil, not only from contamination, but also from exposure to that heat which, in combination with moisture, can serve as an incubating chamber for this virulent organism. There is a further practical application. It is this. Feed no infants artificially on milk that has not been quite recently boiled. I say ‘boiled,’ because in the houses of the poor, sterilisation apart from boiling cannot be expected. But, I would add, there is no sterilising apparatus that can give results comparable with those provided by nature



in the healthy female breast; and I would venture further to maintain that no milk from the mammary gland of its mother ever caused the death of an infant from this specific Summer Diarrhoea."

It will be seen, then, that among the lessons derived from recent research are these: that it is of the utmost importance to protect the soil in the neighbourhood of dwellings from pollution, and that this may be effected in two ways: by removing the causes of pollution, and by rendering the ground in the immediate neighbourhood of dwellings really impermeable.

A paper by Dr. John Robertson, the Medical Officer of Health for Sheffield, in the "British Medical Journal" of January 8th, 1898, gives an account of valuable researches which he had been conducting during several years at St. Helens into the same subject.

Dr. Robertson was conducted to this research by his observations on the recurrence of Typhoid Fever in particular groups of houses.

His first step was to endeavour to determine the presence of the typhoid bacillus in different soils. But this he did not succeed in doing, owing perhaps to the immense difficulty of the task. His next step was to inoculate soils with artificial cultivations of the micro-organism of Typhoid Fever and subsequently to determine what happened in the inoculated soil. The circumstances of the field in which the inoculations were made were carefully determined, and at the same time an artificial soil was made in a chloride of calcium tower, and inoculated. In the latter no growth took place, and the cultures appeared to have rapidly died out. The cultures of the micro-organism were sown in the field in May, 1896, on separate patches, on the surface, at a depth of 9 inches, and at a depth of 18 inches, care being taken in the latter instances to inoculate only the bottom of the sections.

On August 26th, and again on October 20th, 1896, the patches were examined, and all were found to contain living micro-organisms of Typhoid Fever. On November 27th, however, the examinations gave, all of them, negative results. The average of the readings of the thermometer for the week ending November 7th was 23° F.

Towards the end of August, 1896, three other patches were inoculated, and examined on November 27th. All gave negative results.

In the middle of January, 1897, Dr. Robertson commenced to feed the three last patches with dilute organic solutions. The three first patches received no artificial food.

On June 3rd, 1897, samples were taken from each of the six patches. Those from the three unfed patches gave no result. Those from the fed patches all revealed the presence of the typhoid bacillus.



On July 11th, 1897, similar results were obtained. Examination: made to determine whether the micro-organism had spread to adjoining ground were entirely negative.

This, however, may have been due to sparsity of growth.

Dr. Robertson's investigations, then, appear to show that the typhoid micro-organism can persist in soils through the winter, and that when the soil is artificially fed, which, as the author points out, may be effected by a leaking drain, or, we may add, by the access of filthy water from the surface, the micro-organism takes on fresh growth in the warm season. He further points out that the deleterious effect of sunlight does not penetrate below the surface. Cultures of the typhoid organism planted at a depth of 18 inches were found to have grown to the surface, and it was also shown that those planted on the surface had penetrated to a depth of 3 inches. "It was abundantly proved that the typhoid organism could grow over moist surfaces of stones, &c."

These important researches, then, give much additional importance to adequate protection of the soil from surface filth, and from defective drainage, a matter on which stress has been laid in these reports in previous years.

## FEVER ADMINISTRATION.

The following is a complete list of the forms, etc., used in the Public Health Department of this City in dealing with infectious disease generally. Many additions have been made in recent years in the methods of our procedure

This entails a large amount of detail work on the staff of the Health Office. Space will not permit the forms being reproduced.

- Set 1. Medical Certificate of Diseases, made up in books of 25.  
 Special letter and Medical Certificate attached, used for sending to medical men in suspicious cases, etc.  
 Smallpox Form.  
 Scarlatina Form.  
 Diphtheria Form.  
 Membranous Croup Form.  
 Enteric Fever Form, with special inquiry form attached.  
 Typhus Fever Form.  
 The Law about Infectious Diseases.  
 Precautions against Infectious Diseases.  
 Medical Certificate of Recovery, signed by medical men in cases nursed at home.  
 Medical Officer of Health's Certificate for cleansing and disinfecting houses, etc.

- The Town Clerk's 24 hours' notice for stripping, etc., of houses.  
Freedom from Infection Certificate, served on Occupiers, Day  
Schools, and Sunday Schools (if any) 7 clear days after  
disinfection.
- Set 2. Letter card for Schoolmaster or Schoolmistress sent by Inspector.  
Circular Form for Schoolmaster or Schoolmistress sent from office,  
giving description of onset of Scarlet Fever and Diphtheria.  
Special letter to Schools *re* incidence of Scarlet Fever.  
Notification of infectious disease Form for Clerk to School Board  
Houses certified free from Infection Form do.  
Patients discharged from or dying in Hospital Form do.  
Circular Form to the Chief Librarian *re* Books in infected houses.  
Letter sent to other than Corporation Libraries.  
Sanitary Inspector's report Form. Condition of Schools.
- Set 3. Pamphlet. Some points in the investigation of Smallpox.  
Do. Enquiries into origin of cases of Scarlet Fever.  
Do. Informal address by Medical Officers of Health to  
Inspectors *re* Enteric Fever.
- Set 4. Instructions in reference to Disinfection.
- Set 5. Collection of Leaflets on Diarrhoea, Consumption, Measles, Whoop-  
ing Cough, Suggestions to Householders, How Infants should  
be fed, etc.
- Set 6. Board Schools Form of Children absent from School suffering  
from Measles, Whooping Cough, etc.  
Inspector's inquiry Form into Measles and Whooping Cough.  
\*Notice to School *re* Measles.  
\*Notice to Parents *re* Measles.  
Precautions against Measles.  
\*Notice to School *re* Whooping Cough.  
\*Notice to Parents *re* Whooping Cough.  
Precautions against Whooping Cough.  
Instructions to Inspector, after death from Measles or Whooping  
Cough.  
Circular letter to Schools *re* attendances of children and number  
away with Measles, etc.  
Closing Order to Schools, signed by members of Sanitary Authority.  
Circular letter, suggesting closing of Sunday Schools.  
Circular letter to Schools, in vicinity of School which is closed.  
Sanitary Inspector's Form *re* condition of schools.
- Set 7. Precautions against Summer Diarrhoea.  
Diarrhoea Medicine label.  
Investigation Form after death from Diarrhoea.

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\* These Certificates are served for the Medical Officer of Health by the School Board  
Attendance Officer.



Set 8. Circular letter to Medical men *re* Bacteriological examination of Diphtheria. (Feb. 3rd, 1896.)

Small blue slip of instructions for obtaining specimen for cultivation.  
Circular to Medical men sent on receipt of Certificate for Diphtheria asking for specimen.

Circular letter to Medical men *re* Bacteriological examination of Enteric Fever. (January 8th, 1897.)

Directions for taking a sample of blood (large slip and small wrapper for tube).

Circular to Medical men *re* facility of application of Bacteriological tests. (May 6th, 1897.)

Circular to Medical men sent on receipt of Certificate for Enteric Fever asking for specimen.

Copies of letters and Professor Delépine's reports sent to Medical men.

Cases of infectious disease are notified in Manchester under the Local Act of 1881.

On the occurrence of a case of notifiable infectious disease coming to the knowledge of a medical practitioner, it is notified to the Medical Officer of Health, at the Town Hall, stating whether the case is or is not fit for removal to the Fever Hospital. By this statement I am largely guided.

Thereupon a form, distinct for each separate disease, is prepared for the Sanitary Inspector, by the entry of the address, sex, age, etc., of the patient, and the Inspector forthwith visits the case, and makes a number of prescribed inquiries, filling in the necessary particulars on the forms. At the same time he supplies the householder with two papers, one setting forth a short extract on the law relating to infectious disease, and the other giving instructions how to prevent infection. (Set 1.)

If the patient is being nursed at home, the Inspector leaves a certificate of recovery, to be filled in by the medical attendant, and forwarded to the Health Office, when he considers that the time has arrived at which disinfection should be carried out. (Set 1.)

The inquiry forms require a considerable amount of intelligence to answer satisfactorily. In recognition of this the Sanitary Inspector is provided, for some of the diseases, with a short account of the points which he will find it important to remember.

The inquiry forms, which were, in part, prepared by my predecessor (Dr. Tatham), are coloured differently for each disease. This is useful as a matter of arrangement. (Set No. 1.)



A free telephonic communication with the Police and Fire Stations in different parts of the City also much facilitates the sending of messages by medical practitioners to the Public Health Office in any matter of urgency. Arrangements also exist by which the telephones are utilised by the Sanitary Inspectors for communication with the office. When the office is closed, medical men usually send a message direct to the Ambulance Station at 299, Oldham Road.

The Inspector, on arrival at the residence of the patient, should place himself on pleasant and friendly relations with the inmates by a few sympathetic and cheerful remarks. His first step is, of course, to say who he is. His next to express his sympathy with the inmates in a neighbourly manner, as unofficial as possible, and yet not too familiar. Having put the people at their ease regarding his visit, he then proceeds to make the necessary inquiries about the case. This he will, of course, do in a systematic manner to save time.

First of all, he asks how the illness commenced, getting the dates as accurately as possible. Then he finds out whether anyone else in the household has been ill; and if he finds that such is the case, he ascertains when this has been so, and whether the illness resembled in any way that of the case reported. From this he passes on to ascertain the possibility of other sources of infection. I lay considerable stress on this part of the inquiry, since it is evidently not much use adopting strict and expensive measures of isolation and disinfection if ascertainable cases of the same disease continue to scatter infection. Inspectors are instructed that they should never hazard any opinion on the nature of the illness which has been reported, and that, if invited into the sick room, he must not examine the patient.

The inquiry forms take account of the family history, the school or place of business, the history of disease in the household, the circumstances of the household as regards isolation, and the sanitary conditions of the house. It is always well to hark back to first principles, and to know why we take account of certain factors. Recent research has tended to represent the condition of the ground as most important, and indicates that anything which serves to introduce infection or pollution into the soil, whether defective drainage, defective closets, broken flags, defective slop-pipes, and so forth, must be regarded as dangerous. For various reasons, damp, especially of the lower part of a house, is a dangerous condition. The importance of internal disrepair lies in the difficulty of dislodging infection. Light is the great purifier, especially when aided by fresh air. Hence the absence of light is favourable to the propagation of disease. So is overcrowding, for obvious reasons.

When, from the inquiry form, it is apparent that a serious defect exists in these important particulars, the Inspector is requested to report again on the steps taken to remove the injurious conditions reported, and continues to report until they have been removed.

The work which has been done in recent years as a sequence to Fever cases is both very large in amount and excellent in quality.

Seven clear days after disinfection of the house a "freedom from infection" certificate is served on the occupier, on the day school, and also on the Sunday school (if any).

If the patient or any member of a family in which Scarlet Fever, Diphtheria, or Smallpox has occurred is attending school, a special letter card to the schools is posted by the Inspector, immediately after his visit, in the nearest pillar box.

The Inspector's inquiry form having been handed in, a Clerk in the Health Office also takes from it the school, if any, which the patient has attended, and a circular letter form is at once sent to the school, containing instructions to the schoolmaster or schoolmistress as to the steps which they should take to protect their classes. (Set 2.)

If several cases of the same disease have occurred in a school within a short period, a special letter is addressed to the head teacher.

Daily lists of newly notified cases are sent to the Clerk to the School Board, who is also furnished with lists of discharges and deaths at the Fever Hospital. In this way the Attendance Officers are able to prevent infective children from going to school, and seven clear days after the disinfection of a house the School Board is notified, so that the Attendance Officer can get the children to school again.

Information is also sent to the Libraries of library books which have been found exposed to infection, so that they may be withdrawn from circulation.

Supposing a number of cases have occurred in a school, the school is at least put through the usual procedures of disinfection, or it may be closed for some weeks and subjected, not only to disinfecting and cleansing measures, but also to the prolonged influence of light and fresh air.

At the same time a special and full report is made to me on the hygienic relations of the school, and many useful improvements have been effected in consequence. (Set 2.)

There is, however, one difficulty which has not been met. It is the custom for school children to use the same books, which are mixed indiscriminately. Now supposing a child at school to contract Diphtheria or Measles or



Whooping Cough. At the commencement of the illness this child coughs or sneezes a quantity of infectious material on his school book. He ceases to appear in school, but the infected book does not cease to circulate and to disseminate infection.

This occurrence might, perhaps, be avoided by providing each child with a numbered locker, and a corresponding numbered place at the school desk, and requiring him to keep his books separate in his own locker.

#### ISOLATION.

The subject of isolation in a household is a difficult one. Where a patient has proper lodging and accommodation at home, we have no power to insist on his removal to hospital. Indeed it is desirable, as far as possible, to avoid the direct application of force in the removal of patients. The kindly and efficient administration of the Isolation Hospital, a gentle and considerate manner on the part of the Sanitary Inspector, and an experience of the many inconveniences arising from attempting to treat Fever at home in unsuitable cases, these are the influences which aid us in getting cases removed, and in protecting the public by that means.

How far the object has been attained in Manchester is best seen by considering the proportion of cases removed to the Isolation Hospitals in recent years.

NUMBER OF INFECTIOUS CASES NOTIFIED, AND PROPORTION  
REMOVED TO HOSPITAL.

		1891	1892	1893	1894	1895	1896	1897
SCARLATINA	{ Notified	1138	1671	2031	2230	2302	2389	1790
	{ Removals %.	62	59	58	60	71	74	80
DIPHTHERIA and M. CROUP	{ Notified	456	497	622	512	402	239	150
	{ Removals %.	19	25	18	23	17	18	29
ENTERIC FEVER	{ Notified	761	610	618	460	493	513	503
	{ Removals %.	51	50	42	53	46	52	59

If a child, for any reason, cannot be removed to hospital, it is the duty of the Inspector to explain to the relatives what are the essential features of isolation. These may be stated briefly as complete isolation of the patient and nurse, who must occupy one room during the whole of the illness, including convalescence, until all danger of infection has passed over. The subsidiary conditions are contained in the printed instructions which the Inspector hands to the relatives, but which it is essential that he should be familiar with, and explain orally. He must be particularly insistent on the necessity of keeping the door of the sick room closed, and of preventing any infected article leaving the room.



In the case of Typhoid Fever especially, the excreta, body washings, clothing, etc., of the patient should be plunged into a disinfectant, and great care must be exercised in keeping the patient strictly clean. A good disinfectant is a 5 per cent solution of carbolic acid.

Strict isolation in a private house is for the most part impossible, owing either to the requirements of the household or to the want of knowledge of the relatives.

It is therefore very satisfactory to see the increasing and high proportion of cases isolated in hospital, a proportion which reflects the greatest credit on the Hospital Authorities and on the Sanitary Inspectors.

From all these diseases the proportion of patients isolated in 1897 was the highest on record. Practically all cases of Smallpox are removed to hospital, and it is usual, as far as possible, to see cases of this disease before removal to the hospital.

The inquiry forms, if accurately and carefully filled in, each particular being verified by personal examination, are capable of throwing valuable sidelights on disease. Unless, however, both care and intelligence are exercised they are valueless, and the worst of it is that those which are badly filled in vitiate those which are well done. For example, I have deduced from the particulars supplied by these forms that there is a relationship between the incidence of Typhoid Fever and the character of the privy accommodation. This is subject, however, to the conditions that the closets have been accurately observed and that the diagnosis is correct. Then, again, the Inspectors' returns seem to show a connection between the incidence of Scarlet Fever and fouling of the ground, a conclusion which rests largely on the accuracy of the observations. The most important part of these inquiries, however, is that which concerns itself with the source from which infection has come in any particular case. This is often a very difficult matter to ascertain, cases of all these diseases occurring, and that not infrequently, so slight that they have been altogether overlooked.

With a view to enable the Sanitary Inspector to form an opinion on the cases which require investigation, and so to put the Medical Officer of Health on his guard, I have drawn up memoranda on Scarlet Fever and Smallpox, which are supplied to each Inspector, and which, if carefully studied, should also assist him in tracing the source of infection. They receive also a statement on some of the more recent points in connection with Typhoid Fever. (Set 3.)

#### DISINFECTION.

When a patient is removed to hospital a 24 hours' notice to disinfect is handed to the relatives (Set 1), and at the expiration of that time a handcart is wheeled from the Disinfecting Station containing the brushes, disinfecting

solution, and so forth, necessary. At the same time a disinfecting van calls to carry the bulky articles of bedding, clothing, etc., requiring to be disinfected to the Disinfecting Station.

As regards the disinfection of the house, the sick room or the whole house is disinfected according to the degree of isolation.

It is no easy matter to entirely remove the infection which has been left at the home of the patient. Such infection will cling to the clothing of the mother or nurse, to the surface of infected rooms, to the bedclothes, and furniture. The best system of disinfection devisable will not take account of everything. It is, of course, desirable that the clothing worn by the person who has been much in contact with the child should be disinfected. This can be easily effected if the nurse has a change of clothing, as her clothes can then be taken to the Disinfecting Station along with other articles.

Where there is a shelter available at the Disinfecting Station, the nurse may have a bath, receive a change of clothes and have her clothing disinfected, and the same, of course, applies to whole families.

Another way of getting over the difficulty is to take a portable disinfecter to the house, and disinfect the infected clothing, clothes provided by the Corporation being meantime supplied.

That is the plan which we have tried in Manchester by means of Delépine's portable disinfecter, which was introduced about two years ago, and which, though not used to the extent which I anticipated, seems likely to be of particular value in rural districts.

By one or other of these means it should always be possible to disinfect infected personal clothing.

#### THE DISINFECTION OF INFECTED ROOMS.

The plan of disinfecting the atmosphere is still adhered to in Manchester, though we are considering the advisability of abandoning it. It is, however, merely accessory. The essential condition is the washing of all surfaces which have been exposed to infection with a solution of chloride of lime,  $1\frac{1}{2}$  ounce to the gallon. This method is the outcome of Professor Delépine's researches, and is, we believe, effectual. The floor is first wetted to fix infectious particles. The walls, if papered, are then wetted with the solution and the paper removed. The ceiling is then washed with a 1 per cent. solution of chlorinated lime. Then the walls are rewashed with the solution. The furniture is washed, and removed when possible as soon as washed, so as to limit the amount of chlorine given off. Finally the floor is cleansed and washed with the solution. Instead of the above solution, a spray of perchloride of mercury is not infrequently employed elsewhere. Besides that there may be



some doubt as to whether it is always as effectual as the chlorinated lime solution, there would appear to be some danger of mercurial poisoning to the disinfectors. It is also more expensive than the chlorinated lime solution.

A third method, very rarely permitted, in special cases, is based on Esmarch's research on the removal of infected matter by means of crumb of bread.

Our regular and preferable method is, however, to wash with a solution of chlorinated lime ( $1\frac{1}{2}$  ounces to the gallon) the floor, walls, ceiling, and other surfaces in the room. This process is rapidly followed by a free disengagement of chlorine on the surfaces washed.

The process is sometimes troublesome to the disinfecter, even in the dilute solution employed, and must not be dawdled over; but no grievance, I am told, is now experienced by the men who carry out the process.

The method is, on the whole, we think, a good one, and it is supplemented by the subsequent disengagement of chlorine in the room to be disinfected, which will, now, have the advantage of a considerable amount of moisture to assist its action. It is doubtful, however, how far this is necessary.

The bedclothes, mattresses, etc., which are carried off to the Disinfecting Station, are removed from the infected room in sacking, disinfected after each use, so as to avoid carrying infection into the house, a precaution which we owe to Dr. T. C. Railton, of Withington.

The method of disinfection at the Station is a peculiar one. Formerly the articles were put into a hot-air chamber built of brick, and exposed to dry heat. The dimensions of this chamber are as follows :—

#### DISINFECTOR, OLDHAM ROAD DEPÔT.

Inside measurements :—16 feet by 12 feet. 8 feet high.

Doors :—5 feet by 2 feet 7 inches.

Walls :—18 inches thick.

A large quantity of sand on the top.

Now adjoining this chamber is a large Lancashire boiler which supplies steam to do the work of the yard, which belongs to the Cleansing Department. The hot-air chamber was formerly converted into a steam chamber by admitting steam by means of a  $\frac{1}{2}$ -inch pipe from the Lancashire boiler, the disinfection being preferably done at night, when the steam is disengaged. The amount of steam admitted was, however, insufficient to raise the temperature to boiling point.



Taking advantage, however, of Professor Delépine's views on the application of steam, we had a large pipe put in from the boiler of  $1\frac{1}{2}$ -inch internal diameter. The result is that an enormous rush of steam takes place when the tap is turned, and a thermometer against the wall of the chamber reaches  $212^{\circ}$  F. within a quarter of an hour, while the steam rapidly penetrates the most bulky articles. I may say, however, that the various articles are taken out of the bundles, and spread out as freely as possible on racks. Two recent trials show  $210^{\circ}$  F. attained through a thick bundle in 15 minutes and  $211^{\circ}$  F. through 32 folds of blanket in 30 minutes.

In fact the disinfector is now, for practical purposes, efficient, and is capable of disinfecting an enormous quantity of articles. Of course, it is not often that the conditions are so favourable for the conversion of a hot-air oven into a useful disinfector. At the same time, no pressure whatever is attained in the chamber.

The Fever Hospital possesses a Manlove and Alliott Machine, which may be used either as a high-pressure or as a current-steam disinfector.

Under the Metropolitan Asylums Board, the patients are removed in the charge of an ambulance nurse. In Manchester, however, a relative takes the place of the nurse, an arrangement which is more economical, but has disadvantages of its own—disadvantages, however, not insurmountable.

In times of stress, when several infectious diseases are prevalent at one time, a great demand may be made on the ambulance service, and it is then a matter of the greatest moment that patients shall not take one disease while being removed on account of another. The greatest stringency must be then exercised in disinfecting the ambulances, and special instructions are supplied with this view. It may be assumed that under such a mode of proceeding no infection will take place.

The number of ambulances attached to the Fever service in Manchester is five: three large ambulances and two broughams.

Some special points deserve mention.

As soon as a case of Typhoid Fever is reported at a house, a special pail with lid is provided to receive the excreta and washings of the patient. This pail is charged with a disinfectant, which should be either a strong solution of carbolic acid or a solution of chlorinated lime. The procedure is not adopted if the patient is removed to hospital. The contents of this special pail are desiccated in such a manner as to destroy the infective properties of its contents. They might, also, be cremated if convenient. This procedure is valuable as a preventive in proportion as the case has been reported early. Where the illness has exceeded a week in duration, the contents of the midden or pail attached to the house should be thoroughly disinfected or cremated. In the case of a water-closet, the greatest care should be exercised in disinfecting the seat, pan, and any portion which could have been soiled. The woodwork, even lift-up tops, should be carefully cleansed.

In the case of pail-closets adjoining a house and middens, it is our custom to do something towards disinfecting the ground which may have been infected through Typhoid Fever and Scarlet Fever.

A further development of Fever administration has recently taken place in Manchester. The Corporation have for the past two years offered to practitioners the advantage of having bacteriological examinations made in respect of reported cases of Diphtheria. During nearly the whole of 1897, the serum diagnosis of Typhoid Fever, owing largely to the initiative of Professor Delépine, has been carried out. Perhaps for both diseases Manchester may be said to have offered exceptional facilities, and so to have obtained a great measure of success in the introduction of these new methods. Arrangements have been made by which the tests are made as quick, as little burdensome, and as useful as possible to both medical men and to the relatives of the patients.

But, as a result of the efforts made to suit the convenience of medical men, the extent to which the tests have been used has been surprising. It is necessary indeed to say that a number of these tests have been made after removal of the patients to hospital, the great majority having been made, however, before removal.

The figures for 1897 are as follows :—

	No. of Cases examined	Positive	Negative	No. which medical man still adheres to as against the test	Cases which have either died or not been examined	Cases finally accepted
DIPHThERIA ...	318	88	230	12	22	122
ENTERIC .....	623	380	243	32	72	484



I may add that the great majority of the medical men are fully persuaded of the immense value of the new methods, especially, I think, for Typhoid Fever.

There can be no question that the introduction of these aids is a great public advantage.

The bacteriological test for Typhoid Fever does not fail, for instance, as soon as a patient recovers, so that we are enabled to ascertain in difficult cases what would otherwise be regarded as very doubtful sources of infection. The people are in many instances saved the worry and expense of disinfection.

The resources of infectious hospitals are extended by the exclusion of unsuitable cases, and the expenses of such hospitals are diminished. Finally, by obtaining a great addition to our means of diagnosing these diseases with accuracy, we are, or ought to be, much nearer to an accurate knowledge of their causation and prevention.

#### ADMINISTRATIVE WORK, OTHER THAN FOR NOTIFIABLE DISEASE, ADOPTED FOR THE PROTECTION OF THE HEALTH OF THE COMMUNITY.

With regard to Measles and Whooping Cough, these diseases of childhood are dealt with in a special article.

All the deaths from Summer Diarrhoea and Simple (or English) Cholera are enquired into specially by the Sanitary Inspectors, and particulars as to feeding, etc., of the deceased—the greatest number of whom are infants—is filled up on the enquiry forms, and any sanitary defects noted. These forms are not filed until the insanitary conditions have been removed.

With regard to Phthisis or Consumption, the Sanitary Committee, after every death, have for some time undertaken to disinfect, free of charge, on the condition that the tenants hold themselves responsible for the re-decoration, etc., of the room, and this has now become a systematic procedure, and disinfection is now adopted in over half of the houses in which death takes place.

Leaflets have also been sent by the instruction of the Committee to every house in the City on the following subjects :—

1. The Prevention of Diarrhoea.
2. The Prevention of Consumption.
3. Precautions against Measles.
4. Precautions against Whooping Cough.
5. Suggestions to Householders.
6. How Infants should be Fed, etc.



The last-named leaflet is distributed by the several Registrars of Births and Deaths to every person who registers the birth of a child ; and my thanks are due, and are hereby recorded, to the Registrars for their valuable help in this matter.

The whole of these leaflets are constantly being distributed by the Sanitary Inspectors, and by the Female Health Visitors, who work in the poorer districts of the City. By this means, and for a considerable time now, an important educational work has been going on, and I cannot but hope that a beneficial effect has been exerted on the health of the community.

It may further be stated that an enquiry is made into every death occurring in Manchester, week by week, and if any insanitary conditions are found in the houses they are forthwith remedied, by notice or otherwise.

These deaths, with the necessary particulars, are entered on cards (originated by Dr. Tatham), from the returns which I receive weekly from the Registrars of Births and Deaths :—

Blue	card represents	.....	ages 0-1
Pink	„	„	„ 1-5
White	„	„	„ 5-60
Yellow	„	„	„ 60 and upwards.

These cards, when filled up, are utilised in the work of vital statistics, which is done by the staff, in the Department.

MEASLES.

The following are the rates of mortality for 1897, compared with the mean of the previous five years :—

1897—MEASLES MORTALITY.—ANNUAL RATE PER 1,000 LIVING.

	1892	1893	1894	1895	1896	Mean	1897
England and Wales .....	0·46	0·37	0·39	0·37	0·56	<b>0·43</b>	0·40
33 Great Towns .....	0·69	0·44	0·63	0·53	0·71	<b>0·60</b>	0·55
London .....	0·80	0·38	0·76	0·60	0·82	<b>0·67</b>	0·43
<b>City of Manchester...</b>	<b>0·72</b>	<b>0·57</b>	<b>0·42</b>	<b>0·96</b>	<b>1·05</b>	<b>0·74</b>	<b>1·17</b>
Manchester Township ...	1·32	0·86	0·26	0·94	1·89	<b>1·05</b>	1·69
North Manchester .....	0·44	0·63	0·30	0·70	1·01	<b>0·62</b>	0·63
South Manchester .....	0·49	0·35	0·60	1·11	0·57	<b>0·62</b>	1·18
67 Smaller Towns .....	0·40	0·51	0·31	0·38	0·64	<b>0·45</b>	0·43
Rural Districts .....	0·30	0·27	0·24	0·26	0·43	<b>0·30</b>	0·29

The deaths from Measles in districts are as follows :—

Statistical Areas	Estimated Population to middle of 1897	No. of Deaths
City of Manchester .....	536,426	628
I. Manchester Township ...	145,688	246
II. North Manchester.....	141,909	89
III. South Manchester.....	248,829	293
I. { Ancoats .....	45,737	94
Central .....	36,211	76
St. George's .....	63,740	76
II. { Cheetham .....	31,006	11
Crumpsall .....	9,556	2
Blackley.....	8,024	3
Harpurhey .....	11,881	7
Moston .....	6,581	4
Newton Heath .....	37,063	37
Bradford .....	22,896	10
Beswick .....	10,788	7
Clayton .....	4,114	8
III. { Ardwick .....	37,472	43
Openshaw .....	30,803	23
Gorton (West) .....	27,680	49
Rusholme and Kirk.....	19,494	13
Chorlton-upon-Medlock..	61,580	55
Hulme .....	71,800	110

The following are the deaths in quarters, which shows that the disease was most prevalent in the second and third quarters of the year :—

1897—MEASLES.—DEATHS IN QUARTERS IN THE CITY AND IN GROUPS OF DISTRICTS.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
City of Manchester .....	87	218	227	96
Manchester Township ...	61	98	68	19
North Manchester .....	9	26	37	17
South Manchester .....	17	94	122	60

WHOOPING COUGH.

The rates giving the Whooping Cough mortality for 1897 are as follows :—

WHOOPING COUGH MORTALITY.—ANNUAL RATE PER 1,000 LIVING

	1892	1893	1894	1895	1896	Mean	1897
England and Wales .....	0·46	0·34	0·39	0·30	0·41	<b>0·38</b>	0·35
33 Great Towns .....	0·57	0·48	0·48	0·37	0·57	<b>0·49</b>	0·41
London .....	0·59	0·54	0·48	0·34	0·65	<b>0·52</b>	0·41
<b>City of Manchester...</b>	0·72	0·46	0·55	0·47	0·66	<b>0·57</b>	0·56
Manchester Township ...	0·86	0·64	0·55	0·72	0·92	<b>0·74</b>	0·68
North Manchester .....	0·60	0·28	0·45	0·37	0·50	<b>0·44</b>	0·29
South Manchester.....	0·69	0·45	0·60	0·38	0·60	<b>0·54</b>	0·64
67 Smaller Towns.....	0·49	0·31	0·39	0·32	0·43	<b>0·39</b>	0·38
Rural Districts .....	0·32	0·23	0·33	0·25	0·30	<b>0·29</b>	0·31

The following figures show that Whooping Cough was more prevalent in the first half of the year :—

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
90	127	55	27



The deaths in districts are as follows :—

STATISTICAL AREAS	ESTIMATED POPULATION TO MIDDLE OF 1897	NO. OF DEATHS
City of Manchester .....	536,426	299
I. Manchester Township .....	145,688	99
II. North Manchester .....	141,909	41
III. South Manchester .....	248,829	159
Ancoats.....	45,737	30
Central .....	36,211	24
St. George's .....	63,740	45
Cheetham .....	31,006	8
Crumpsall .....	9,556	4
Blackley .....	8,024	1
Harpurhey .....	11,881	7
Moston .....	6,581	4
Newton .....	37,063	4
Bradford .....	22,896	12
Beswick .....	10,788	1
Clayton .....	4,114	...
Ardwick .....	37,474	30
Openshaw .....	30,803	17
West Gorton.....	27,680	24
Rusholme .....	19,494	12
Chorlton-upon-Medlock .....	61,580	20
Hulme .....	71,800	56

It will be seen that the number of deaths recorded from Measles in 1897 was 628, and from Whooping Cough 299, the former disease being more prevalent in the second and third quarters of the year, and the latter disease in the first and second quarters. The areas most affected with Measles were the districts comprising the Manchester Township and the South of Manchester, the same areas being also affected with Whooping Cough.

The following schools, or portion of schools, were closed in the course of the year :—

School	Department
Abbott Street Board Schools, Rochdale Road.....	Infant
Duke Street Board Schools, Hulme .....	Infant
Lees Street Board Schools, Openshaw .....	Infant
St. Augustine's Roman Catholic Schools, Granby Row.....	Infant
St. Andrew's Church of England Schools, Baird Street.....	Whole School
St. Mary's Church of England Schools, Hulme .....	Infant
St. Cross' Church of England School, Clayton .....	Whole School
Gill Street British School, Moston Lane .....	Whole School
All Souls' Church of England Schools, Ancoats .....	Infant
Bangor Street Board School, Hulme.....	Infant
Mulberry Street Board School, Hulme .....	Infant
Grosvenor Square Board School, Chorlton-upon-Medlock.....	Infant
St. Mary's Church of England Schools, Drayton Street, Hulme .....	Whole School
St. Michael's Roman Catholic Schools, Ancoats .....	Whole School
St. Andrew's Church of England Schools, Higher Blackley .....	Whole School
All Saints' Church of England Schools, Newton.....	Infant
St. John's Church of England Schools, Gartside Street.....	Infant
St. Michael's Board School, Hulme .....	Infant
St. Andrew's Church of England School, Homer Street .....	Infant
St. Matthew's Board Schools, Deansgate .....	Infant
Christ Church Board Schools, Greenheys.....	Whole School
St. Thomas's Board Schools, Cheetham .....	Infant
St. Ann's Church of England Schools, Newton Heath .....	Infant
St. Peter's Board School, Ancoats.....	Infant
St. John's Church of England Schools, Longsight .....	Infant
St. Paul's Board School, Ten Acres Lane, Newton Heath .....	Infant
Armitage Street Board School, Ardwick .....	Infant
St. Paul's Church of England Schools, Chorlton-upon-Medlock .....	Infant
St. Mary's Roman Catholic Schools, Deansgate .....	Infant
St. Saviour's Church of England Schools, Chorlton-upon-Medlock.....	Infant
St. Clement's Church of England Schools, Gorton.....	Infant
Gill Street British School, Blackley .....	Whole School (2nd time)
Albert Memorial Church of England Schools, Queen's Road .....	Infant
St. Saviour's Church of England Schools, Chorlton-upon-Medlock.....	Infant
St. Thomas's Board Schools, Crumpsall .....	Infant
St. Luke's Church of England Schools, Chorlton-upon-Medlock.....	Infant
All Saints' Church of England Schools, Chorlton-upon-Medlock.....	Infant
Grosvenor Street Board School, Chorlton-upon-Medlock .....	Infant
Cathedral Church of England Schools, Todd Street .....	Infant

The question of how far the Sanitary Authority can deal with Measles and Whooping Cough in their earlier stages has received special attention during the last four years.



The following system of dealing with these diseases has been in operation in Manchester since November, 1897, and it is certain, I think, that some advance has been made in the application of the ordinary means available to a Health Department in dealing with both. Whenever the School Board Attendance Officers come across cases of either disease, they serve our certificates at the homes of the children affected, and also on the school where the children attend. They also leave a leaflet of precautions.

Every Monday morning there comes from the Clerk to the School Board a list of all cases which the Attendance Officers have come across in the course of their daily duties during the previous week. The information thus obtained is entered for each case on a form of enquiry provided for the use of the Sanitary Inspectors.

The Sanitary Inspector, furnished with this form, containing the address of the children reported by the School Board, visits the house, ascertains the conditions of isolation, investigates the sanitary circumstances of the premises, and instructs the householder as to the precautions which must be taken as regards the isolation of the patient, the ventilation, etc., of the room, and the measures necessary to avoid infecting the school. At the same time, he conducts inquiries into other cases of Measles or Whooping Cough which may have occurred in the neighbourhood, and if any such are ascertained he visits the houses, and enters on the forms the particulars relating to the new cases which he has discovered. Such action is subsequently taken as may be necessary to remove insanitary conditions. Particulars are also abstracted from the School Board returns and entered in the "Schools Register" under the particular week, and if there are five or more cases of either disease in any school, then a circular letter is despatched for information as to the average and present attendance, actual cases, and number of children away on account of disease in the home. This information is furnished in departments.

On the receipt of the information from the managers of the schools, the particular department of the school in which the actual cases exceed 10 per cent. on the ordinary average attendance is, as a rule, closed for three weeks, the whole school being closed only when the disease has made substantial progress in other departments. At the same time, if the building is used for Sunday School purposes a letter is despatched to the Superintendent, suggesting closing the particular department of the Sunday School.

This statement covers all denominational schools, and the courtesy and readiness with which this request is carried out must be gratefully acknowledged. In addition, whenever a day school is closed, a circular letter is sent to the schools in the immediate vicinity, asking the managers not to admit scholars from the school affected.

Whenever a school is closed, the walls, furniture, floors, etc., are washed with a solution of chlorinated lime  $1\frac{1}{2}$  ounces to the gallon, and, whilst the atmosphere is damp, chlorine gas is generated throughout the building.



The Sanitary Inspector also makes a detailed report as to the sanitary condition of the school, and if any defects are found the managers are communicated with. A considerable amount of improvement has thus been obtained.

It will thus be seen that a great amount of detail work is done by the department in the endeavour to cope effectively with these rapidly spreading diseases.

Further, the Sanitary Inspectors regularly visit every house in which a death occurs, and, so far as Measles and Whooping Cough are concerned, they instruct the householders as to the means of disinfection to be adopted. This applies more specially to cases which have not otherwise come to the knowledge of the department.

It will be seen that instead of the partial and uncertain, as well as often belated information which the department has hitherto received, we are now in a position to act with a fair amount of promptitude, besides having the means of ascertaining the distribution of the disease as well as a considerable proportion of the individual cases.

The public spirit of the School Board in furnishing regularly to the Health Department weekly information of all cases coming to their knowledge in public elementary schools cannot be too highly commended, and the information supplied has been of the very greatest utility.

Reasons were given in the Annual Report for 1896 why we must regard the closing of whole schools, or, as is more generally done, of the infant departments, as a beneficial proceeding, and this subject may, therefore, be relegated to a future report.

### SUMMER DIARRHŒA.

On the 3rd July, 1897, the four-foot thermometer stood at  $56^{\circ}$ , the critical point at which Dr. Ballard has shown that Summer Diarrhœa assumes a prevalent character. The thermometer continued to rise until, on the 31st of July, it stood at  $59^{\circ}$ , and on the 14th of August at  $60^{\circ}5$ , but from this date a gradual fall set in, and on September 30th it stood at  $55^{\circ}$ .

The following are the registered deaths from Diarrhœa and Simple Cholera in weeks during the third quarter of the year :—

July 10th.....	8
„ 17th.....	7
„ 24th.....	15
„ 31st.....	35
Aug. 7th .....	73
„ 14th.....	154
„ 21st.....	171
„ 28th.....	116
Sept. 4th.....	71
„ 11th.....	63
„ 18th.....	43
„ 25th.....	28
Oct. 2nd.....	19
	<hr/>
	803
	<hr/>

The large number of deaths in August corresponds to an abnormally high temperature registered between the 28th of July and the 4th of August, when the maximum thermometer in the shaded screen rose from  $65^{\circ}$  to  $86^{\circ} 4$ .

By means of the following rates we are enabled to compare the fatality from Diarrhoea in Manchester with that prevailing in other parts of the country :—

1897.—DIARRHOEA MORTALITY.—ANNUAL RATE PER 1,000 LIVING.

	1892	1893	1894	1895	1896	Mean	1897
England and Wales .....	0·48	0·96	0·35	0·88	0·55	<b>0·64</b>	0·86
33 Great Towns .....	0·70	1·23	0·50	1·19	0·79	<b>0·88</b>	1·24
London .....	0·60	0·80	0·41	0·82	0·72	<b>0·67</b>	0·92
<b>City of Manchester</b> .....	0·79	1·75	0·70	1·66	1·04	<b>1·19</b>	1·74
Manchester Township .....	1·08	2·22	1·11	2·20	1·43	<b>1·61</b>	2·33
North Manchester .....	0·68	1·49	0·52	1·38	0·79	<b>0·97</b>	1·48
South Manchester .....	0·67	1·59	0·54	1·50	0·94	<b>1·05</b>	1·54
67 Smaller Towns .....	0·57	1·24	0·41	1·13	0·68	<b>0·81</b>	1·05
Rural Districts .....	0·32	0·72	0·24	0·64	0·36	<b>0·46</b>	0·56

The following table supplies meteorological data for the third quarter of the year, the season in which the disease is most prevalent :—

Third Quarter of the years	Mean Temperature	Rainfall, Inches	Humidity, per cent.	Diarrhoea Mortality. Annual Rate per 1,000 living
1887	$59^{\circ} 0$	7·7	73 %	3·38
1888	$56^{\circ} 5$	11·2	77 %	1·36
1889	$57^{\circ} 7$	10·5	73 %	2·61
1890	$58^{\circ} 8$	8·1	74 %	2·28
1891	$58^{\circ} 2$	12·8	79 %	1·57
1892	$57^{\circ} 0$	12·5	78 %	2·07
1893	$60^{\circ} 4$	10·7	74 %	4·95
1894	$57^{\circ} 8$	9·0	78 %	1·55
1895	$60^{\circ} 4$	11·2	77 %	4·17
1896	$58^{\circ} 5$	9·7	76 %	2·86
<b>Mean</b>	<b><math>58^{\circ} 4</math></b>	<b>10·3</b>	<b>76 %</b>	<b>2·68</b>
1897	$58^{\circ} 9$	9·7	73 %	5·78

The numbers of deaths in quarters are as follows :—

DIARRHŒA DEATHS IN QUARTERS 1891-1897.

	1891	1892	1893	1894	1895	1896	1897
First Quarter .....	45	32	48	47	51	37	49
Second Quarter .....	64	36	131	55	59	78	50
Third Quarter .....	217	275	688	212	574	379	773
Fourth Quarter .....	106	75	89	61	220	66	61
	432	428	956	375	904	560	933

By means of the following table we are enabled to observe the comparative degree of severity with which different districts of the City have been visited. It should be compared with the corresponding tables in recent reports :—

1897.—DEATHS AND DEATH-RATES FROM DIARRHŒA IN THE VARIOUS DIVISIONS OF THE CITY.

STATISTICAL DIVISIONS	Estimated Populations	Deaths	Death-rates
City of Manchester .....	536,426	933	1.74
I. Manchester Township .....	145,688	339	2.33
II. Northern Districts .....	141,909	210	1.48
III. Southern Districts .....	248,829	384	1.54
I. { Ancoats .....	45,737	148	3.24
Central .....	36,211	62	1.71
St. George's .....	63,740	129	2.02
II. { Cheetham .....	31,006	31	1.00
Crumpsall .....	9,556	5	0.52
Blackley .....	8,024	3	0.37
Harpurhey .....	11,881	26	2.19
Moston .....	6,581	5	0.76
Newton Heath .....	37,063	47	1.27
Bradford .....	22,896	62	2.71
Beswick .....	10,788	22	2.04
Clayton .....	4,114	9	2.19
III. { Ardwick .....	37,472	51	1.36
Openshaw .....	30,803	50	1.62
West Gorton .....	27,680	53	1.91
Rusholme and Kirk .....	19,494	16	0.82
Chorlton-on-Medlock .....	61,580	51	0.83
Hulme .....	71,800	163	2.27



It will be seen that there were 933 deaths registered from Diarrhoea. Of this number, 679 were under one year of age, 194 between the ages 1-5, and 29 were 65 years of age and over. These deaths are equal to a rate of 1·74 per 1,000 of the population, the rate varying from 1·48 in North Manchester to 2·33 in the Manchester Township. The rate in South Manchester was 1·54. The district most affected was Ancoats with a rate of 3·24, followed by 2·71 in Bradford, 2·27 in Hulme, 2·19 in Harpurhey and Clayton, and 2·04 in Beswick.

### ON UNHEALTHY DWELLINGS.

During the year 1897, a considerable amount of dissatisfaction was expressed with the operations of the Sanitary Committee in condemning back-to-back dwellings, and converting them into through dwellings. In an account of the subject given by the Chairman of the Sanitary Committee, Alderman Walton Smith, it was pointed out that this was mainly owing to the circumstance that the rapidly increasing population of the City was causing a demand for all classes of habitation, even the most inferior, and that, in consequence, any disturbance was severely felt on account of the difficulty of finding unoccupied houses. It is certain that the same difficulty would have arisen had there been no interference with insanitary dwellings, and that as a natural consequence there would, in any case, have been a temporary tendency to overcrowding in the Central and Southern parts of the City, with a strong impulse to the erection of new houses for artisans in the unoccupied parts of the City area, and on the outskirts. How marked has been this tendency may be seen from the following figures, which I am enabled to give by the kindness of neighbouring authorities:—

NUMBER OF NEW HOUSES ERECTED IN MANCHESTER, SALFORD, AND SURROUNDING DISTRICTS, 1891-1897.

DISTRICT	1891	1892	1893	1894	1895	1896	1897
Manchester .....	716	899	682	713	1088	1965	2205
Salford .....	...	254	564	454	613	883	872
Eccles .....	141	164	109	100	118	113	165
Flixton .....	8	10	33	48	28	57	47
Stretford.....	30	43	38	274	356	313	355
Irlam .....	37	7	11	19	28	21	24
Worsley .....	19	47	54	66	81	53	61
Urmston .....	73	45	42	34	80	102	135
Withington.....	23	31	17	50	70	79	162
Didsbury .....	31	42	33	26	79	55	45
Burnage .....	...	...	26	21	...	1	24
Chorlton-cum-Hardy..	81	63	10	37	94	155	182
TOTAL .....	1159*	1605	1619	1842	2635	3797	4277

\* Salford omitted.

NOTE.—The last four Townships comprise the area of the Withington District Council.

Two results have flowed from the condition of things which has been mentioned. The Corporation are in course of erecting, from plans prepared by the City Surveyor, new dwellings, including a model lodging-house, on the areas (which were condemned under the Houses of the Working Classes Acts) off Chester Street, Oldham Road, Pott Street, and Harrison Street, which are calculated to accommodate 1,346 persons.

There has, at the same time, been a considerable arrest in the beneficial operations of the Committee in dealing with back-to-back houses, which it is to be hoped will be of brief duration. The position and condition of the closets attached to such houses is, alone, sufficient to render them highly dangerous to health, and injurious to the habits of the occupants.

It is true that when such houses are closed, even for alterations, which do not take a long time to effect, there is a liability to overcrowding in other dwellings which receive the displaced families.

The strain which is thus experienced ought to be met by the erection of new dwellings on the outskirts of the City, and it is evident that the more amply the requirements of the growing population are satisfied in this manner, the greater will be the relaxation on the demand for dwellings in the Central districts.

Such a solution of the difficulty, however, whether complete or partial, involves fresh considerations. Dwellings can, it is true, be erected for artisans on the outskirts more cheaply than they can be erected in the centre of the City, and rents are, therefore, lower in outlying districts with corresponding accommodation. But, on the other hand, the price of transit is increased.

Recognising the importance of this set-off against living at a distance from the centre, the Chairman of the Sanitary Committee is at present engaged in an effort to obtain cheap and convenient means of transit for workmen under the provisions of the Cheap Trains Act, 1883. It may be hoped also that when the trams come under the management of the Corporation, similar provision will be made along the tramways, the development of which may be made to subserve the extension of the City.

One important expense which must not be forgotten will be saved to artisans by living on the outskirts, namely, the expense of health and life.

It might be urged against the detailed improvements effected under the Sanitary Committee that when areas are entirely cleared, and new dwellings are erected, they are calculated to house a number of persons equal to the number displaced, while they are constructed in accordance with modern sanitary conceptions.

This is certainly the case. On the other hand, such dwellings have been, so far, erected partly at the public expense, an expenditure of public money which is surely justified. But they have also entailed an amount of disturbance



and displacement, compared with which the displacement effected by improvements in back-to-back dwellings is trifling. Moreover, the displacement which they have effected is permanent, since it is only to a limited extent that the same people find their way to the newly-erected dwellings.

There is, in fact, no way in which improvements can be effected in insanitary dwellings without considerable disturbance, especially under existing conditions.

The only mode in which the strain and hardship can be effectually relieved is by a rapid extension of dwellings in the outskirts, sufficient to relieve the pressure within, while, at the same time, the health of the displaced artisans and of their families will be materially improved.

Too much attention cannot, then, be bestowed on seeing to the sanitary condition of such new dwellings as regards structure, space round the dwellings, and safeguarding of the space immediately adjoining the houses against damp. It is to be hoped also that the efforts being made to facilitate transit will be successful, though the improvement in the health of the artisan would be in itself a considerable gain.

There is another reason why every encouragement should be given to the erection of new and better dwellings on the outer fringe. A natural process by which the worst central areas are cleared off is the erection on them of warehouses, the demand for which will increase with increasing trade. The rate at which such areas will be cleared, however, will depend largely on the expense of the site, and largely also on the possibility of obtaining suitable accommodation elsewhere for the persons displaced.

Thus, a rapid extension of new houses on the fringe not only benefits the artisan, but removes restrictions on the expansion of trade.

It is useless, meantime, to blink the fact that the very prosperity which has come to the City has so far proved unfavourable to those improvements which are urgently required in the conditions of habitation.

Yet it is precisely the increase in the population which renders it urgent that no effort should be spared to improve the condition of dwellings.

At present, at all events, it would seem as if the increased accommodation being provided were actually in excess of the increase in the population.

A new movement has arisen in favour of the provision of dwellings for the very poor, that is to say, for people earning wages which would not enable them to pay more than two shillings per week. Some movement in this direction has been made in Dublin, Glasgow, and Liverpool. It seems clear that this cannot be effected, so far as the erection of new dwellings is concerned, in the inner parts of the City, except at the public expense, in part at all events.



## BAKEHOUSES DEALT WITH DURING 1897.

The principles on which we have dealt with bakehouses have been sufficiently explained in previous annual reports. The following is a list of those dealt with since the publication of the Annual Report for 1896 :—

### BAKEHOUSES CLOSED.

ADDRESS.	DATE.
70, Vine Street, Hulme .....	July 27th, 1897
28, Bednall Street .....	Aug. 12th, „
372, Rochdale Road.....	Sept. 6th, „
12, Oldham Road .....	Sept. 6th, „
54 and 56, Higher Ormond Street, C.-on-M.....	Sept. 6th, „
374, Stockport Road, Chorlton-on-Medlock.....	Sept. 10th, „
275A, Oldham Road.....	Oct. 5th, „
528, Rochdale Road.....	Oct. 7th, „
249, South Street .....	Oct. 8th, „
17, Church Street .....	Nov. 10th, „
19, Cyrus Street, Ancoats .....	Dec. 29th, „
83, Oldham Street, City.....	Dec. 29th, „
198, Stockport Road, Chorlton-on-Medlock.....	Dec. 29th, „
22, Bury New Road, Cheetham.....	Jan. 7th, 1898
14, Crown Street.....	Jan. 7th, „
4, Ashton New Road .....	Feb. 3rd, „
84, Gorton Lane, West Gorton.....	March 3rd, „
3, Plympton Street, Harpurhey .....	March 3rd, „
128, Butler Street, Ancoats .....	Jan. 24th. „
590, Rochdale Road, Manchester .....	March 29th, „
308, Oxford Street, Chorlton-on-Medlock.....	April 5th, „
52, Conran Street, Harpurhey .....	April 25th, „
300, Waterloo Road, Cheetham.....	April 22nd, „

## BAKEHOUSES ALTERED.

ADDRESS	NAME.	DATE.
9, Stockport Road, Ardwick.....	William Whiteley...	July 15th, 1897
62, Great Ducie Street, Cheetham...	A. Hyman.....	July 20th, ,,
49, Stockport Road, Ardwick .....	B. Marshall .....	Sept. 30th, ,,
118, Oldham Road, Miles Platting...	R. Ashworth.....	Oct. 4th, ,,
50, Bradford Street, Ancoats .....	W. Hodgson.....	Oct. 4th, ,,
215, Wellington Street, Bradford ...	W. Hornby .....	Oct. 5th, ,,
18, Butler Street .....	J. Dean.....	Oct. 26th, ,,
Tuke Street .....	M. E. Baker.....	Nov. 9th, ,,
81, Tamworth Street, Hulme.....	Mr. Collier .....	Feb. 15th, 1898
5, Culvert Street .....	Catherine Price ...	Feb. 21st, ,,
220, Wellington Street.....	Felix Foulsham.....	Feb. 21st, ,,
517, Ashton Old Road, Openshaw...	William Fentem.....	April 5th, ,,
777, Ashton Old Road, Openshaw...	William Fentem ...	April 15th, ,,
168, Chester Road, Hulme.....	M. A. Robinson ...	April 7th, ,,
39, Julia Street, Cheetham .....	Louis Kiminsky ...	April 30th, ,,
27, Chancery Lane, Ardwick .....	Charles Gregory ...	May 9th, ,,
41, Lord Street, Cheetham .....	A. Vitofski.....	May 12th, ,,

During the year 1897, new bakehouses were erected in the following situations :—

STATEMENT OF THE NUMBER OF NEW BAKEHOUSES AND ALTERATIONS TO EXISTING BAKEHOUSES APPROVED BY THE IMPROVEMENT AND BUILDINGS COMMITTEE, AND COMPLETED DURING THE YEAR 1897.

Situation	Date of Approval	Date of Completion
Bakehouse, &c. :— Vine Street, Ashton Old Road, Openshaw	13th June, 1895	9th February, 1897
Additions to Bakehouse :— Rochdale Road and Scropton Street, Harpurhey	10th June, 1896	9th February, 1897
Bakery, &c. :— Mornington Street, Chorlton-upon-Medlock	13th January, 1897	6th September, 1897
Upton Street, Stockport Road, Chorlton-upon-Medlock	23rd September, 1896	16th December, 1897

## COWSHEDS, DAIRIES, AND MILKSHOPS.

In a report on the Manchester cowsheds bearing date April 15th, 1897, I gave the result of a series of investigations into the condition of the Manchester cowsheds, and into the state, as regards tuberculous infection, of the milk taken from cows affected with tuberculosis. This investigation was conducted by Professor Delépine, and showed that the percentage of such cows giving tuberculous milk was 25 per cent., a sufficiently formidable proportion. It must be remembered, however, that these were specially-selected cows, and that nothing like this proportion of tuberculous milk was to be apprehended in samples taken from the Manchester cowsheds at random. These investigations were useful in assisting the department to get rid of tuberculous cows, though, scientifically, they were only a preliminary step to more general action. At the same time a large number (36) of tuberculous cows were removed owing to the examinations made by the Chief Veterinary Surgeon, Mr. James King.

Meantime, Professor Hope was carrying out a line of investigation, which has been pursued also both on the Continent and in America, with results which do not differ very widely from those arrived at by the Liverpool authorities. Having obtained samples of imported milks at the railway stations and at milkshops, as well as of milks produced at the cowsheds in the City, Dr. Hope submitted these to examination by four different bacteriologists. The results obtained were widely different, but in the aggregate it appeared that the proportion of tuberculous milks was much higher among those brought into the City from the country than amongst those produced in the City. This result may be ascribed partly to a stricter control exercised in the City, but, in the main, must be ascribed to the fact that milch cows are kept much longer in the country than in the town.

Whatever be the cause, however, the danger arising from the use of imported milk appeared from these results to be so much greater than that attending the consumption of milk produced in the City that it has been thought desirable to obtain further facts before continuing our Scheme of Control. Accordingly, a series of samples has been collected at the railway station, and submitted to Professor Delépine for examination in respect of tuberculous infection. The results of this inquiry will be given hereafter, but at this point it may suffice to say that they fully bear out the conclusion of the Liverpool inquiry, and that the average milk imported from the country would appear to be nearly as capable of conveying tuberculosis to the unfortunate consumers as samples collected from the most diseased cows we could find in the City, including those which had distinct tuberculosis of the udder.

In the report on Manchester cowsheds, and elsewhere, reason has been given for believing that, as a matter of fact, tuberculous milk is a serious source of disease in infants.



It is, however, not only the propagation of tuberculosis which we have to consider. Summer Diarrhoea is another disease still more fatal, which undoubtedly owes its virulence to contamination of the milk. Such contamination occurs largely at the farm, and is, at all events, partially due to absence of cleanliness in the cows and cowsheds.

Strict cleanliness of both shippens and cows is, in fact, the primary and most important condition of cowkeeping, whether as regards the prevention of tuberculosis, or as regards the prevention of Summer Diarrhoea.

We have, therefore, begun the enforcement of the Regulations under the Cowsheds, Milkshops, and Dairies Order of 1885 by securing a greater degree of cleanliness. As was anticipated, the endeavour to carry out the regulations more completely has ended in a partial suppression. Thus, four cowsheds have been altogether suppressed, and three more are in course of disappearing. Two are at present in the Town Clerk's hands for proceedings. Another homestead is about to be reconstructed. Another will either be vacated or reconstructed, and a promise has been given of reconstruction in the case of still others. In the case of one farm an assurance was given to the Committee that it was about to be abandoned, but this now seems doubtful. If this work has not proceeded more rapidly it is largely owing to the inherent difficulties of dealing with the cowsheds in their present form, and to the necessity of gradually feeling our way as to what is desirable and possible. It will, however, be worse than useless not to lay down sufficiently strict conditions. In regard to the conditions it may be mentioned that, though only 600 cubic feet is being exacted for old cowsheds, no new cowshed will be erected which does not supply the 800 cubic feet of the Model Bye-laws.

Generally speaking, the conditions laid down for reconstructions are these :—

1. Good floors, susceptible of strict cleanliness.
2. Arrangement of the floor space, where possible, so as to secure a feeding-arm and cleanliness of the walls behind the cow, particularly the latter.
3. Ample provision of light.
4. Adequate ventilation, of such a nature as to avoid draughts.
5. The cowsheds to be structurally such as to maintain warmth while allowing of diffused ventilation.
6. Single stalls.

Further, the cows and cowsheds must be maintained in a condition of thorough cleanliness.

The following specification will sufficiently exemplify the changes which it is proposed to carry out :—

#### SPECIFICATION OF WORK REQUIRED.

A middenstead to be provided, the walls to be of 9-inch brickwork, the Middenstead inside surfaces to be made impervious, and, if necessary, the middenstead to be drained to a properly constructed urine tank.

#### *No. 1 Cowshed.*

A new ceiling to be provided at a height of 11 feet from the floor, such ceiling to be formed of tight-fitting tongued and grooved boards, firmly fixed upon smooth planed joists.

The whole of the stalls to be rearranged, so as to provide for 12 single stalls (6 on each side of the feeding passage) in the manner hereafter prescribed :—

1. The floors of the cowshed and feeding passage to be concreted. Floors
2. The cows to be separated by stalls of stone 6 feet long by 5 feet high. At the head of the cows a stone partition 3 feet high to separate the stalls from the feeding passage to be provided.
3. The floor of the feeding passage to incline slightly to a channel to be formed at each side to convey waste water from the feeding troughs outside the building.
4. The floors of the stalls to fall very slightly to the heelstone. The stall to be 7 feet 6 inches in length. The heelstone to be of good flags 3 inches thick, and set evenly at the sill.
5. The floor of the cowshed behind the sill to fall to a shallow manure channel 12 inches wide. Behind this channel the floor to rise gradually to the walls.
6. The manure channel to lead to a gully trap and drains of approved Manure Channel construction outside the cowshed.
7. Each stall to be provided with a good glazed earthenware or stone-ware feeding trough, embedded in good cement concrete, and provided Feeding Troughs and Water supply with a hole and plug and a channel to convey the waste water into the channel in the feeding passage ; each trough to be provided with a water-pipe and tap.
8. To provide six sash windows (two in each side and two in the Windows front walls), the size to be 6 feet long by 3 feet wide, both sashes to be made to open.
9. The whole of the internal walls to be well scraped, cleansed, and Internal Walls pointed, and the surfaces made smooth ; the whole of such walls to be covered with good Portland cement one inch thick to a height of 4 feet 6 inches from the floors.



- External Walls 10. The external walls to be well pointed.
- Ventilators to have Doors 11. The ventilators in the hay-loft over the cowshed to be provided with tight-fitting doors, made to open.
- Roof 12. The roof of the hay-loft to be renewed and made watertight.
- Ventilation 13. Ventilation to be provided by means of numerous 6 inch by 9 inch air grids at the ceiling level. It would be advisable to provide some special means of outlet ventilation if convenient.

*Cowsheds Nos. 2 and 3, with Shed between.*

This building to be reconstructed so as to provide accommodation for 13 cows in single stalls. The division of the stalls, partition in front of the cows, the floors, walls, feeding troughs, water-pipe and taps, to be constructed and provided in a similar manner and on the lines of the specification for No. 1 cowshed.

The feeding passage to be 4 feet wide in front of the cows.

The roof to be renewed and made watertight.

Light Light to be provided by means of eight sash windows (four on each side), the size to be 5 feet by 3 feet, both sashes to be made to open.

Ventilation Constant means of ventilation to be provided as follows :—

Air to be admitted continuously at the eaves, and to be extracted by a cap on the ridge, or by means of extracting shafts and cowls suitably placed on the ridge.

It is suggested that the remainder of the shed be made into a storage room.

Drainage The whole of the drains in connection with the house, cowsheds, stables, &c., to be reconstructed on modern lines ; all such drains to be made with watertight joints, so as to stand the water test.

The surface of the yard adjoining the house, stables, and cowsheds, &c., to be put in proper repair, with proper inclinations to drain inlets ; the space of 6 feet in front of the cowsheds to be paved with smooth sets, and asphalted.

Isolation Cowshed It would be to the advantage of the farm if an isolation shed were provided. It might be of brick or wood, and of sufficient size to contain two cows. Accommodation for one cow, however, would be of value.\*

Milk Storage A small but well-appointed milk store should be constructed opposite the kitchen door.

AUGUST, 1897.

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\* This has no relation to the application of the tuberculin test.



Similar specifications have been supplied in the case of other farms, but, with one exception, have not been carried out, with the result that the cowsheds have been closed.

In all, eleven cowsheds or farms have been before the Committee. Of these, four have been definitely closed; one farmer has received notice from the landlords to give up the farm; one will be, no doubt, closed; one farmer assured the Committee that the farm would be closed; in the case of one, plans have been submitted and passed for reconstruction, and the work will shortly proceed; another will either be closed or the reconstructions mentioned in the above specification will be carried out; two have been reported, and will be dealt with by the Town Clerk.

These operations are to be taken, however, in connection with a general effort to improve the state of the Milk Supply, and the recommendations of the recent Royal Commission on Tuberculosis must be taken to mark the present level of instructed opinion on this subject. These will be found at page 22 of the accompanying Report of the Commission, and, if they become law, will doubtless do much to counteract the evil consequences at present flowing from the unsatisfactory conditions under which milk is produced.

Briefly, the recommendations of the Commission deal with tuberculous meat and tuberculous milk.

#### TUBERCULOUS MEAT.

The Commission recommend that powers be given to the authorities in towns and municipal boroughs to replace private by public slaughter-houses. In rural districts the inspection of meat is to be administered by the County Council.

Meat Inspectors are to be specially qualified.

Rules are provisionally laid down for the guidance of Meat Inspectors in condemning the carcasses of animals affected with tuberculosis.

#### AS REGARDS MILK.

Notification is recommended of all diseases of the udder—to whom is not stated. Local authorities to have power to cause the slaughter of cows affected with disease of the udder, compensation being given. Power to be given to local authorities to take samples and make analyses, presumably bacteriological, of the milk produced or sold in their districts.

The Local Government Board to be empowered to require local authorities to adopt regulations as to dairies, cowsheds, &c. Restrictions are to be placed on the occupation of cowsheds near a dwelling-house. Cowsheds in populous places to be registered only under certain conditions.

Local authorities in districts from which milk is supplied to another district to be bound, when asked by the local authority of the latter, to supply full information and veterinary reports regarding the condition of the cows, byres, &c., whence the milk is drawn. When the local authority are dissatisfied with the reports so obtained, they may apply to the Local Government Board, with a view to an independent inspection and report being made. This section does not appear to meet the requirements of the case.

It is proposed to place funds at the disposal of the Board of Agriculture in England and Scotland and of the Veterinary Department of the Privy Council in Ireland for the preparation of commercial tuberculin, and to encourage stockowners to test their animals by the offer of a gratuitous supply of tuberculin and by the gratuitous services of a veterinary surgeon on certain conditions.

This is a most valuable proposal, and has the advantage of being based on the experience of the Danish Government.

I would commend these excellent proposals to your attention as custodians of the health of the children of the community, so that such steps may be taken by you as may seem best to further the proposals of the Commission. They do not go so far as your Medical Officer of Health would desire, nor altogether in the same direction; but they would mark a great stride forward in the elimination of tuberculosis, and in the improvement of our milk supply generally.

Meantime, the statement which I have made on a former occasion, that the milk supply of the City is, too much of it, both dirty and tuberculous, if it is not now true to the same extent as when that statement was first made, may still be repeated.

The investigations which we have carried on into the conditions of our milk supply will, I hope, shortly be published. But the matter has now reached a stage at which we stand on the firm ground of ascertained fact, and some means should be devised of arresting the influx into our City of foods which are calculated to produce a fatal and spreading disease among the children of the community.

We are in this singular position at present, that we can at once stop a milk supply which is shown to be the means of propagating Scarlet Fever, Diphtheria, or Enteric Fever, though our proofs be only inferential and incomplete, and though such occurrences are of great rarity, and we are in a position to stop milk supplies from cows affected with diseases which have not been shown to be communicated by milk, and which, again, are rare; but though we can produce the most absolute proof that milk is being constantly supplied to us from the country charged with the infection of tuberculosis we cannot legally take any action whatever.



## WORK OF THE LADIES' HEALTH SOCIETY.

No report on the sanitary work of the Manchester Corporation would be complete which did not include some reference to the work done by the Ladies' Health Society in the poorer parts of the City. This organization concerns itself partly with social and partly with sanitary matters. Established as early as 1862, it has of late appeared to grow in strength and influence. That portion of the work in which the Society come into relation with the Health Office is carried out by Health Visitors, who are employed, guided, and assisted by the ladies who form the Society, and it may, therefore, be of general use to reproduce a brief *résumé* of the work which is carried on by the Health Visitors, and which was presented to the Sanitary Committee on February 23rd, 1898.

There is no doubt whatever that there is a large amount of work to be done which is not touched by the Sanitary Inspectors, and which is essential to the permanent improvement of the community as regards the maintenance of conditions necessary to health, more especially in connection with cleanliness of the house and person.

The Female Health Visitors live in their respective districts, and are at the constant call of the people for help and advice in cases of emergency. They visit the houses systematically—six hours a day, except Saturday—and a report of their work is received each morning by the Medical Officer of Health.

The following are some of their duties :—

They supply lime in suitable cases for purposes of limewashing, and lend out Turk's head and flat brushes for use. One Visitor alone during the last 12 months has had 50 bedrooms, and numerous sculleries, cellars, yards, and closets thoroughly limewashed by the tenants.

They supply carbolic soap to poor people at 2d. per lb., or 5d. a bar of 3lbs., which is used in the cleaning of their houses, giving away a little at their discretion.

In those cases where soap is supplied free, the Health Visitor sees that it is applied to the intended purpose of cleansing the house. The cleaning of floors, burning of refuse, washing of clothes, and other points of the same kind, are matters of great moment to health, in which the Female Health Visitors give much useful instruction and direction. In other domestic details they give valuable guidance. The Visitors carry with them disinfecting powder, explaining its use, and leaving it where necessary ; at the same time they make a record of any dangerous condition discovered. The importance of fresh air is dwelt upon, and one Health Visitor during the last 12 months has sold some 50 blocks of wood for putting underneath the lower sashes of windows, so as to direct a current of air upwards into the living or bed rooms. These are purchased at 3s. 6d. per dozen, and sold at 3½d. each.



An important part of their work is that which is devoted to the interests of children.

They call attention to bad clothing and neglected conditions, and do what they can to remedy what is wrong—sometimes even dressing the children in case of neglect, and giving clothing in suitable cases of want. They give systematic instruction on infant feeding. They also instruct the mothers, in a precise manner, how to keep the children's heads clean, and see that it is actually done. They report cases of cruelty to the National Society for the Prevention of Cruelty to Children. One Health Visitor has reported during last year over ten cases in her district, of whom two have been before the magistrates, and one got six months' imprisonment.

Very often, indeed, the Visitors come across children undressed and half dressed even towards dinner time. They insist upon the parents attending to their children in this respect, and exercise a permanent influence in getting young children properly washed and dressed.

They fulfil an important part in the distribution and oral explanation of printed instructions on feeding children, and on the steps which a householder must take to keep his family in good health. I have given in my last annual report the results of an inquiry which they made for me on infant feeding. It is largely through them that a knowledge of the contents of handbills on sanitary matters becomes known to the poorest class. It may be added that they always take with them a supply of instructions on Diarrhoea, Consumption, Measles, and Whooping Cough, which they utilise as occasion arises.

The Health Visitors also visit on behalf of the Medical Officer of Health the homes at which deaths have occurred, except from any infectious disease, and fill up the card supplied to them in each case.

They also do other work of a very useful nature, such as lending out maternity bags to poor people, and, in cases of general illness, sheets, night dresses, pillow cases, etc.

In summer the Health Visitors recommend suitable children to the Children's Holiday Fund, see to the cleanliness of the children before they go for the holiday, and collect the money due from the parents under the direction of the Lady Superintendents, who manage all the pecuniary affairs of the Society.

In 1890 the Corporation paid the wages of six of these Female Health Visitors ; they now pay the wages of nine.

## WORK OF THE LADIES SOCIETY FOR VISITING THE JEWISH POOR.

This Society have also two Female Health Visitors fully employed amongst the Jewish poor in Red Bank and Strangeways, and work on similar lines as the Ladies' Health Society as stated above.

These Societies do a large amount of work under the joint guidance of the Public Health Department and their respective Committees, of which a systematised account will be given on another occasion.

## MONSALL FEVER HOSPITAL.

### REPORT FOR THE YEAR 1897.

The work of a Fever Hospital, of necessity, varies greatly, even during the same year, on account of the seasonal prevalence of the different diseases, and the year 1897 was no exception to the rule.

Throughout the year the permanent staff of officers remained the same, comprising 4 medical officers, the lady superintendent of nurses, the house matron, and an assistant house-matron.

The number of nurses and servants, however, altered with an increase in the number of patients. This increase is most readily seen by the accompanying table ;—

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Daily average number of patients	239·86	217·7	339·0	488·8
Actual number of patients admitted	356	386	611	802

From this it is noticed that there was a steady increase during the whole of the second half of the year, and the number of nurses and servants, which had been 67 and 49 respectively in the early part of the year, rose to 84 and 59 respectively towards the end of the year.

The total number of admissions for the year was 2,155, and the total number of deaths 186, giving a net mortality of 8·6 per cent., or if the 266 cases remaining in the hospital on January 1st, 1897, be included, a mortality

of 7·6 per cent. The monthly distribution of the cases, the relative numbers of the different diseases, the districts from which they were removed, and an idea of the results of treatment, will be obtained from the accompanying tables.

During the first quarter of the year, use was made of the hospital for the clinical instruction in Infectious Fevers of the students of the Owens College. The classes which were held were conducted to the different wards by the Medical Superintendent, the instruction being given by Dr. Steell, Honorary Physician to the Manchester Royal Infirmary.

During the second quarter of the year a series of lectures were given to the nurses by the Medical Superintendent on nursing, with especial reference to the treatment of infectious fevers.

With the exception of illnesses contracted through their attendance upon the patients, the health of the staff has, I am pleased to say, been very good, the ailments suffered from being, with one exception, of a mild nature.

Of the Infectious Fevers contracted by the staff, 5 nurses suffered from attacks of Enteric Fever, and one of these illnesses unfortunately terminated fatally.

14 nurses and 2 servants contracted Scarlet Fever, and 4 nurses contracted Diphtheria. All of these recovered completely from their attacks.

Remaining in Hospital, 1st January, 1897 .....	266
Patients Admitted during 1897 .....	2155
	<hr/>
	2421
	<hr/>

#### DISCHARGED.

Cured and Died.....	1978
Remaining in Hospital, 31st December, 1897 .....	443
	<hr/>
	2421
	<hr/>
Total Number of Deaths .....	186
Nett Mortality .....	8·6 per cent.

If the 266 cases of 1st January, 1897, be included, the mortality would be 7·6 per cent. Of deaths, 15 occurred within 48 hours of admission.



DAILY AVERAGES.

Patients .....	321.24
Nurses and Servants .....	118.07
Officers .....	6.5
Daily average stay, in days .....	56.05

1897	Scarlet Fever	Enteric Fever	Diphtheria	Morbilli	Erysipelas	Pneumonia	Unclassified	Total	Daily Average Number of Patients in Hospital
January ...	89	14	2	...	2	2	9	118	252.7
February..	57	21	2	1	4	1	4	90	234.7
March ...	109	18	6	2	5	2	6	148	232.2
April .....	86	10	7	6	...	...	8	117	238.4
May .....	82	12	1	2	3	1	11	112	201.0
June .....	130	8	4	4	2	2	7	157	214.3
July .....	150	12	1	9	3	1	9	185	294.5
August ...	134	9	5	4	3	...	2	157	324.1
September	211	46	6	...	...	2	4	269	355.6
October ...	214	46	15	4	4	3	5	291	466.4
November	215	49	5	...	...	3	8	280	498.5
December.	156	63	4	...	2	3	3	231	493.5
Total .....	1633	308	58	32	28	20	76	2155	317.15

SHOWING THE NUMBER OF VARIOUS DISEASES.

DISEASE	REMAINING IN HOSPITAL, JAN. 1ST, 1897	ADMITTED TO DEC. 31ST, 1897	DISMISSED CURED, AND DIED DURING 1897	REMAINING IN HOSPITAL, DEC. 31ST, 1897
Scarlatina .....	228	1,633	1,495	366
Diphtheria .....	6	58	62	2
Enteric Fever.....	28	308	252	84
Pneumonia .....	...	20	19	1
Erysipelas .....	...	28	27	1
Morbilli .....	...	32	32	...
Unclassified .....	4	76	78	2
Total...	266	2,155	1,965	456

SCARLET FEVER.

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Ad-mitted	Died	Mor-tality per cent.	Ad-mitted	Died	Mor-tality per cent	Ad-mitted	Died	Mor-tality per cent.
Under one year...	5	3	60·0	9	6	66·6	14	9	64·2
1 to 2 years...	36	13	36·1	27	10	37·0	63	23	36·5
2 to 3 „ ...	70	6	8·5	43	7	16·2	113	13	11·5
3 to 4 „ ...	66	5	7·5	70	7	10·0	136	12	8·8
4 to 5 „ ...	78	6	7·6	78	8	10·2	156	14	8·9
5 to 10 „ ...	278	5	1·7	397	14	3·5	675	19	2·8
10 to 15 „ ...	137	1	0·7	149	2	1·3	286	3	1·0
15 to 20 „ ...	57	4	7·0	43	...	...	100	4	4·0
20 to 25 „ ...	21	...	...	32	1	3·1	53	1	1·8
25 to 30 „ ...	6	...	...	14	...	...	20	...	...
30 to 35 „ ...	7	...	...	5	...	...	12	...	...
35 to 40 „ ...	...	...	...	1	...	...	1	...	...
40 to 45 „ ...	1	...	...	...	...	...	1	...	...
45 to 50 „ ...	1	...	...	1	...	...	2	...	...
Over 50 „ ...	...	...	...	1	1	100·0	1	1	100·0
Total .....	763	43	5·6	870	56	6·4	1633	99	6·1

NOTE.—Five died within 48 hours of admission.

COMPLICATIONS IN FATAL CASES OF SCARLET FEVER.

DISEASE	MALE	FEMALE	TOTAL
Nephritis .....	6	3	9
Anginose .....	22	28	50
Bronchitis .....	1	...	1
Maligna .....	11	8	19
Empyema .....	1	...	1
Uræmia .....	2	1	3
Broncho Pneum. ....	3	2	5
Croupous do. ....	...	2	2
Cardiac Failure.....	...	2	2
Meningitis .....	...	1	1

## ENTERIC FEVER.

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Ad- mitted	Died	Mor- tality percent.	Ad- mitted	Died	Mor- tality percent.	Ad- mitted	Died	Mor- tality percent.
Under one year...	...	...	...	...	...	...	...	...	...
1 to 2 years...	...	...	...	...	...	...	...	...	...
2 to 3 „ ...	3	...	...	2	...	...	5	...	...
3 to 4 „ ...	2	...	...	5	...	...	7	...	...
4 to 5 „ ...	1	...	...	2	...	...	3	...	...
5 to 10 „ ...	10	1	10'0	23	1	4'3	33	2	6'1
10 to 15 „ ..	36	...	...	22	...	...	58	...	...
15 to 20 „ ...	41	6	14'6	23	3	13'0	64	9	14'1
20 to 25 „ ...	23	3	13'0	20	2	10'0	43	5	11'8
25 to 30 „ ...	16	7	43'7	15	2	13'3	31	9	29'0
30 to 35 „ ...	21	5	23'8	12	3	25'0	33	8	24'2
35 to 40 „ ...	6	1	16'6	8	1	12'5	14	2	14'2
40 to 45 „ ...	3	1	33'3	3	1	33'3	6	2	33'3
45 to 50 „ ...	2	1	50'0	...	...	...	2	1	50'0
Over 50 „ ...	4	2	50'0	5	1	20'0	9	3	33'3
Total...	168	27	16'1	140	14	10'0	308	41	13'3

NOTE.—One died within 48 hours of admission.

## COMPLICATIONS IN FATAL CASES OF ENTERIC FEVER.

DISEASE	MALE	FEMALE	TOTAL
Hæmorrhage .....	6	1	7
Peritonitis .....	7	...	7
Pneumonia .....	...	1	1
Relapse .....	...	1	1
Total...	13	3	16



MORBILLI.

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Ad-mitted	Died	Mor-tality percent.	Ad-mitted	Died	Mor-tality percent.	Ad-mitted	Died	Mor-tality percent.
Under 1 year.....	...	...	...	2	...	...	2	...	...
1 to 2 years ...	3	...	...	3	...	...	6	...	...
2 to 3 „ ...	2	...	...	2	...	...	4	...	...
3 to 4 „ ...	2	...	...	5	...	...	7	...	...
4 to 5 „ ...	1	...	...	1	...	...	2	...	...
5 to 10 „ ...	2	...	...	4	...	...	6	...	...
10 to 15 „ ...	1	...	...	...	...	...	1	...	...
15 to 20 „ ...	...	...	...	2	...	...	2	...	...
20 to 25 „ ...	...	...	...	2	...	...	2	...	...
Total...	11	...	...	21	...	...	32	...	...

ERYSIPELAS

AGE	MALE		FEMALE		TOTAL		
	Admitted	Died	Admitted	Died	Admitted	Died	Mortality per cent
Under 5 years .....	...	...	1	...	1	...	...
5 to 10 years .....	...	...	1	...	1	...	...
10 to 15 „ .....	2	...	3	...	5	...	...
15 to 20 „ .....	2	...	2	...	4	...	...
20 to 25 „ .....	4	...	...	...	4	...	...
25 to 30 „ .....	1	...	1	1	2	1	50'0
30 to 35 „ .....	3	...	1	...	4	...	...
35 to 40 „ .....	1	...	1	...	2	...	...
Over 40 „ .....	3	...	2	1	5	1	20'0
Total...	16	...	12	2	28	2	7'1

PNEUMONIA.

AGE OF PATIENTS	MALE		FEMALE		TOTAL		
	Admitted	Died	Admitted	Died	Admitted	Died	Mortality per cent.
Under one year .....	...	...	...	...	...	...	...
1 to 2 years .....	...	...	...	...	...	...	...
2 to 3 „ .....	1	1	...	...	1	1	100'0
3 to 4 „ .....	...	...	1	...	1	...	...
4 to 5 „ .....	...	...	...	...	...	...	...
5 to 10 „ .....	3	...	1	...	4	...	...
10 to 15 „ .....	3	...	1	...	4	...	...
15 to 20 „ .....	3	...	...	...	3	...	...
20 to 25 „ .....	1	...	...	...	1	...	...
25 to 30 „ .....	...	...	...	...	...	...	...
30 to 35 „ .....	...	...	...	...	...	...	...
35 to 40 „ .....	1	1	...	...	1	1	100'0
40 to 45 „ .....	...	...	...	...	...	...	...
Over 45 „ .....	4	2	1	...	5	2	40'0
Total .....	16	4	4	...	20	4	20.0

NOTE.—One died within 48 hours of admission.

UNCLASSIFIED CASES.

DISEASE	MALE	FEMALE	DISEASE	MALE	FEMALE
			Brought forward ...	13	26
Varicella .....	2	1	Pleuritis .....	1	1
Tonsillitis .....	2	9	Acne .....	1	...
Catarrh.....	3	4	Anæmia .....	...	3
Acute Gastritis ...	...	1	Laryngitis .....	1	3
Puerperal Fever...	...	4	Hæmorrhagic Nephritis	...	1
Chronic Peritonitis	1	1	Hydronephrosis .....	1	...
Gastro Enteritis ...	1	...	Secondary Syphilis .....	...	1
Rötheln .....	2	3	Neurosis .....	...	1
Baby* .....	...	1	Medicinal Rash .....	1	...
Neurasthenia .....	1	...	Tubercular Peritonitis...	...	1
Hysterical Mania	...	1	„ Periostitis ..	1	...
Parotitis .....	1	...	Cephalalgia .....	...	1
Bronchitis .....	...	1	Urticaria .....	1	...
Carried forward...	13	26	Total...	20	38

NOTE.—Four died within 48 hours of admission.  
\* Admitted with mother.

Patients with no stated illness .....	17
Patients unclassified .....	59
Total...	76

Patients cured .....	47
Patients died (15 male and 14 female) .....	29
Total...	76

Nett Mortality on Unclassified Cases .....38·1

#### CASE MORTALITY FOR 1892-97.

Year 1892.....	12·32
„ 1893.....	9·36
„ 1894.....	7·82
„ 1895.....	9·73
„ 1896.....	10·6
„ 1897.....	8·6

Total average Case Mortality for the last six years—9·7.

#### DIPHTHERIA.

During the year, 58 cases of Diphtheria came under treatment. The age and sex distribution of these cases are shown in the following table :—

AGE OF PATIENTS	MALE			FEMALE			TOTAL		
	Ad- mitted	Died	Mor- tality percent.	Ad- mitted	Died	Mor- tality percent.	Ad- mitted	Died	Mor- tality percent.
Under 1 year ...	1	1	100·0	...	...	...	1	1	100·0
1 to 2 years ...	1	...	...	1	1	100·0	2	1	50·0
2 „ 3 „ ...	4	2	50·0	...	...	...	4	2	50·0
3 „ 4 „ ...	1	...	...	4	2	50·0	5	2	40·0
4 „ 5 „ ...	3	...	...	2	1	50·0	5	1	20·0
5 „ 10 „ ...	9	1	11·1	13	1	7·6	22	2	9·1
10 „ 15 „ ...	2	...	...	3	...	...	5	...	...
15 „ 20 „ ...	...	...	...	2	...	...	2	...	...
20 „ 25 „ ...	4	...	...	2	...	...	6	...	...
25 „ 30 „ ...	2	...	...	1	...	...	3	...	...
30 „ 35 „ ...	...	...	...	...	...	...	...	...	...
35 „ 40 „ ...	...	...	...	1	...	...	1	...	...
40 „ 45 „ ...	1	1	100·0	1	...	...	2	...	50·0
Total .....	28	5	17·8	30	5	16·6	58	10	17·2



The complications occurring in the total number of cases are shown in the following table :—

NO. OF CASES	NEPHRITIS		ALBUMINURIA		MORBUS CORDIS		POST. DIPH. PARALYSIS	
	Cases	Per Cent.	Cases	Per Cent.	Cases	Per Cent.	Cases	Per Cent.
58	13	22·4	14	24·1	10	17·2	2	3·4

The complications occurring amongst the fatal cases are given in the following table, which also shows the sex distribution :—

COMPLICATIONS IN FATAL CASES	MALE	FEMALE	TOTAL
Nephritis.....	2	1	3
Morbus Cordis .....	3	2	5
Hæmorrhage .....	...	2	2

Two cases of a severe hæmorrhagic nature occurred during the year, both ending fatally.

Tracheotomy was performed nine times, with three recoveries. Amongst the six deaths, four were due to cardiac failure and two to nephritis, the tracheotomy in each case being considered satisfactory.

Amongst the deaths, three occurred within 24 hours after admission, one within 48 hours, two within 72 hours, and one respectively on the fourth, seventh, tenth, and fifteenth days.

Antitoxin was injected in all cases showing undoubted clinical signs of Diphtheria, even when the case was apparently hopeless. Eighteen of the 58 cases admitted were not subjected to this treatment; none of these latter cases died, and none developed any serious symptoms subsequently, though in each of the cases Löffler's bacillus had been demonstrated. For further consideration the cases may therefore be divided into two classes, according to whether they were treated by antitoxin or not. The following table shows the deaths and complications occurring in two such classes or divisions :—

	No. of Cases	Nephritis		Albuminuria		Morbus Cordis		Post. Diph. Paralysis		Deaths	
		Cases	Per cent.	Cases	Per cent.	Cases	Per cent.	Cases	Per cent.	Cases	Per cent.
Treated with Anti-toxin .....	40	10	25·0	10	25·0	10	25·0	2	5·0	10	25·0
Not treated with Antitoxin .....	18	3	16·6	4	22·2	...	...	...	...	...	...

It will be seen by this table that all the deaths and a large percentage of the complications occurred amongst the patients to whom antitoxin had been administered, but it must be remembered that all these cases were clinically Diphtheria, as well as bacteriologically so ; that most of them were very severe in their character, and showed extreme toxic poisoning ; and that in six of the fatal cases the patients were "in extremis" on admission. The above table also demonstrates that liability to Nephritis is not increased by the use of the serum treatment—this latter subject we, however, have now under special observation. Notwithstanding the serious look of the above table, the impression received is that if antitoxin were given in an early stage in the course of the disease all the cases would recover ; that severe Diphtheritic Nephritis and Cardiac Trouble would be avoided ; and that if the serum could be injected three or four days before tracheotomy would become necessary, that operation would be obviated.

The following table bears out this statement fairly well. One child died within 24 hours after admission. In this case tracheotomy had been performed and antitoxin injected, but as no previous history of the case had been obtained, the case has been omitted from the table :—

	No. of Cases	Tracheotomy		Albuminuria		Nephritis		Morbus Cordis		Deaths	
		Cases	Per Cent.	Cases	Per Cent.	Cases	Per Cent.	Cases	Per Cent.	Cases	Mortality
Antitoxin injected on 2nd day...	7	...	...	...	...	...	...	...	...	...	...
"      "      3rd  ,, ...	4	...	...	1	25	...	...	...	...	...	...
"      "      4th  ,, ...	10	4	40	6	60	1	10	3	30	5	50
"      "      5th  ,, ...	5	1	20	1	20	1	20	2	40	2	40
"      "      6th  ,, ...	5	...	...	...	...	3	60	3	60	1	20
"      "      7th  ,, ...	4	2	50	1	25	2	50	2	50	1	25
"      "      8th  ,, ...	2	...	...	1	50	1	50	...	...	...	...
"      "      9th  ,, ...	2	1	50	...	...	2	100	...	...	...	...

Thus, when antitoxin was injected during the first three days of illness no complications arose, and there were no deaths.

Only one abscess occurred at the seat of antitoxin injection.

Urticarial and erythematous rashes appeared in six cases after antitoxin treatment, and in two cases that had not been so treated.

R. W. MARSDEN,

*Resident Medical Superintendent.*

# REPORT BY MR. A. T. ROOK, SUPERINTENDENT OF THE SANITARY DEPARTMENT.

Sanitary Department,

Town Hall, Manchester,

June, 1898.

In presenting to the Medical Officer of Health the report of the work transacted in the Sanitary Department for the year ending 30th April, 1897, I beg to state that the City, for inspection and other purposes, is divided into 28 districts, to each of which one Sanitary Inspector has been assigned.

In addition to these, there are also seven Drainage, four Smoke, two Canal Boats and Lodging-house, two Adulteration of Food, and six Factory and Workshops Inspectors.

The number of complaints of nuisances of various kinds made during the year was 45,119, viz. :—

3,929	through the Medical Officer of Health's Department.
1,732	by the Public.
2,380	through the Police.
37,078	by the Staff.

The number of inspections and re-inspections was as follows\* :—

37,438	Dwelling-houses.
2,449	Inspections and
6,997	Re-inspections of infected dwelling-houses.
476	Factories and Workshops.
380	Cellars.
422	Offensive trades.
141	Slaughter-houses.
497	Schools.
2,100	Mills.
350	Tips.
25,349	Miscellaneous.

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\* See also table for the year ending December 31st, 1897 (page 172), relating to nuisances.



In 2,638 houses and premises smoke or water tests have been applied to the drains for the purpose of discovering defects.

For the abatement of nuisances of various kinds, 13,202 notices were served, viz. :—

To abate overcrowding	...	...	...	...	...	...	...	...	151
To cleanse and limewash houses	...	...	...	...	...	...	...	...	761
To cleanse privies	...	...	...	...	...	...	...	...	20
To cleanse bakehouses	...	...	...	...	...	...	...	...	.....
To cleanse workshops	...	...	...	...	...	...	...	...	541
To discontinue nuisances arising from black smoke being emitted from chimneys	...	...	...	...	...	...	...	...	190
To repair, &c., house drains	...	...	...	...	...	...	...	...	3,042
To register houses occupied by lodgers	...	...	...	...	...	...	...	...	395
To remove offensive deposits, stagnant water, &c.	...	...	...	...	...	...	...	...	603
To abate nuisances arising from animals kept in a filthy state, or to remove such animals...	...	...	...	...	...	...	...	...	140
To repair, renew, or provide privies, ashpits, or water-closets...	...	...	...	...	...	...	...	...	1,305
To repair yards and passages	...	...	...	...	...	...	...	...	1,324
To repair dilapidated houses	...	...	...	...	...	...	...	...	2,650
To cleanse and disinfect dilapidated houses	...	...	...	...	...	...	...	...	1,749
To provide urinals to public and beer houses	..	...	...	...	...	...	...	...	53
To close houses in a dilapidated, &c., condition and conse- quently unfit for human habitation	...	...	...	...	...	...	...	...	72
To place bakehouses in a proper sanitary condition	...	...	...	...	...	...	...	...	10
To place workshops in a proper sanitary condition	...	...	...	...	...	...	...	...	120
To provide satisfactory means of escape in case of fire at factories and workshops	...	...	...	...	...	...	...	...	54
To close workshops unfit for use on sanitary grounds	...	...	...	...	...	...	...	...	22

33,405 re-inspections have been made after notices to ascertain if the work had been done.

## HOUSES LET IN LODGINGS.

Under the powers given by section 90 of the Public Health Act, the bye-laws made thereunder have been strictly enforced.

The number of houses on the register is 1,370.

To these, 1,343 day visits and 515 night visits have been paid.

70 infringements of the regulations have been reported and dealt with.

175 night visits have also been paid to unregistered houses, the occupiers having previously denied that lodgers were kept.

## DAIRIES, MILKSHOPS, AND COWSHEDS REGULATIONS.

Under this Order, which was made in July, 1879, 2,499 milkshops and dairies and 111 cowkeepers are now on the register. The number of cows kept is 1,472. The number of visits to dairies, milkshops, and cowsheds was 4,237.

It may be stated that many of the dairies and cowsheds are not in a very satisfactory condition, and great reluctance has been shown in the past, in consequence of the very serious structural alterations required, especially in cowsheds, to enforce the alterations necessary to bring them up to the present state of sanitary requirements. The new regulations, it is hoped, will enable the Inspectors to deal more effectually with insanitary cowsheds, &c.

## WORKSHOPS, BAKEHOUSES, AND SHOP HOURS ACTS.

During the year the Act has been fairly well observed, only a few persons <sup>Shop Hours Act</sup> having been reported for infringements.

Experience confirms the opinion that in the absence of a declaration specifying the working hours for each day, as in the case of the Factory and Workshop Acts, it is difficult to produce sufficient evidence before the justices to obtain a conviction, the evidence of the young persons in nearly every instance contradicting the signed declarations previously made to the inspectors.

Considerable improvement has taken place since the last report in the condition of workshops, alterations having been made—either after notice or <sup>Workshop Acts</sup> at the request of the inspectors—to improve the ventilation, lighting, overcrowding, cleansing, and general sanitary conditions.

Special attention has also been given to see that premises are provided with sufficient and satisfactory closet accommodation, this being a common defect in a number of the largest workshops.

In many of the cases reported the necessary accommodation has been provided, and others are under notice, and will be dealt with in due course.

Means of  
escape in case  
of fire

With regard to means of escape in case of fire, the whole of the factories and workshops in the City have been inspected, and as a result a large number were, in the opinion of the inspectors, found to be unsatisfactory, and have been referred to the City Surveyor for his report thereon.

In several of the worst cases the necessary provision has been made ; while the others, some of which are under notice, are receiving attention.

Periodical changes are taking place in various ways which bring buildings within the meaning of the Act, and necessitate the constant supervision of the Inspectors, and action on the part of the authorities.

Bakehouses

During the year several of the worst bakehouses in the City have been absolutely closed, and a number of others have been reported by the Medical Officer of Health to be unfit for use until satisfactory alterations are made to place the premises in a better sanitary condition.

Extensive alterations have been made in many of the bakehouses, and a general improvement is manifest throughout the City consequent upon the action taken by the department.

Out-workers

A general improvement in the condition of houses in which out-work is carried on is very apparent, but constant visitation is necessary to maintain the standard of cleanliness which is to be desired, especially in houses in which shirt-making, handkerchief-hemming, &c., is done. This class of work is almost exclusively confined to the poorer people, who often have large families, and live in small houses in the congested parts of the City.

In the southern part of the City there are, comparatively speaking, only a small number of workshops in which females are employed, so that much of the time of the Female Inspector for the district is occupied in visiting the houses of out-workers.

The people, as a rule, appear willing to carry out any suggestion made by the Inspectors to keep their houses clean ; but, at the same time, it is almost impossible for small houses, sometimes containing large families, to be kept in such a satisfactory condition as workshops.

The work done under the above Acts is shown in the following tables :—



WORK DONE BY THE INSPECTORS UNDER THE ACTS FROM THE 24TH SEPTEMBER, 1896, TO 22ND SEPTEMBER, 1897, INCLUSIVE.

Number of District	INSPECTOR	SHOPS					WORKSHOPS						Factories and Workshops not provided with proper means of escape in case of fire		BAKEHOUSES					
		Number of visits	Number reported for offences against the Act	Number registered during the year	Number struck off register during the year	Total number on register	Number of visits	Number of Sanitary Defects reported	Number of reports sent to Factory Inspector	Number registered during the year	Number struck off register during the year	Total number on register	Number of visits to houses where outworkers are employed	+	Number of visits	Number of Sanitary Defects reported	Number of reports sent to Factory Inspector	Number registered during the year	Number struck off register during the year	Total number on register
1	Edward E. Roberts .....	368	20	43	39	589	2508	244	258	266	186	1035	11	16	555	31	2	1	3	70
2	John Kewley .....	412	5	26	44	773	2698	147	214	229	179	1162	2	15	1033	80	33	32	18	156
3	George S. Spencer .....	476	12	53	4	679	2850	199	188	202	67	1260	2	10	934	151	19	19	7	134
4	Francis J. Rowe .....	380	8	70	25	796	3038	203	257	256	164	1198	...	7	705	45	8	8	6	103
...	Emma Coppock .....	2318	1	162	37	...	1924	38	2	2	52	...	1392	...	2	...	...	...	...	...
...	Alice Tattersall .....	1895	11	140	144	...	1878	24	1	...	95	...	1588	...	...	...	...	...	...	...
...	TOTALS.....	5849	57*	494	293	2837	14896	855+	920	955	743	4655	2995	48+	3229	307§	62	60	34	463

\* In 55 of the 57 cases reported for infringements of the Shop Hours Act, the persons are now complying with the Act.  
+ Of the 855 defects in Factories and Workshops, 97 of the cases have been referred to the City Surveyor to prepare plans for improved closet accommodation, in 56 of which cases the necessary accommodation has been provided; 704 have been remedied, and 54 not remedied, but notices have been served to make good the defects.  
‡ 48 Factories and Workshops have been reported as not being provided on the storeys above the ground floor with such means of escape in case of fire as can reasonably be required under the circumstances of each case. In 7 cases the necessary provision has been made, 8 notices have been served, and 33 cases referred to the City Surveyor for report thereon.  
§ Of the 307 defects in Bakehouses, 275 have been remedied, 8 closed, and 24 not remedied (in 8 of the cases the Medical Officer of Health has reported the premises to be unfit for use on sanitary grounds, and the Sub-Committee referred them to the Town Clerk to take legal proceedings against the occupiers, and 16 occupiers have promised to make good the defects).

## PROSECUTIONS FOR OFFENCES, WITH RESULTS.

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed or otherwise dealt with	Amount of Costs ordered to be Paid
Yates Brothers & Co.	2, Palace Square, Market Street .....	Employing two young persons over 74 hours per week	£ s. d. Dismissed	£ s. d. .....
Mary Stringer .....	20, Lloyd Street, C.-on-M. ....	Ditto (one)	Do.	.....
Abraham Howarth..	117, City Road, Hulme .....	Ditto	Do.	.....
James Stones.....	188, London Road .....	Ditto	Do.	.....
Joseph Ward.....	193, Stockport Road .....	Ditto	0 2 6	.....
The Oxford Billiard and Refreshment Company	73, Oxford Street, City .....	Ditto (three)	Dismissed	.....
George Dook.....	162, Brunswick Street, C.-on-M. ....	Ditto (one)	0 10 0	0 13 6
Ann Elizabeth Willan	2 and 4, Deansgate .....	Ditto (two)	Dismissed	.....
Albert Cave .....	272, Waterloo Road.....	Ditto (one)	0 2 6	0 2 6
George Dook.....	162, Brunswick Street, C.-on-M.....	Not exhibiting Abstract of Act in a conspicuous position in his shop	0 10 0	.....
Frederick Schofield	86a, King Street, City .....	Ditto	Withdrawn	0 3 0
Chadwick Sunley ...	396, Stockport Road .....	Ditto	0 2 6	0 2 6
Frederick Sl. Bell- house	2a, Lister Street .....	Ditto	0 2 6	0 2 6
Simeon Leak .....	134, Oxford Street, C.-on-M. ....	Ditto	Withdrawn	0 3 0
John Henry Baines .	13, Market Place .....	Ditto	Dismissed	.....
Saul Stern .....	70, Hanover Street .....	Neglecting to cleanse and purify workshop, &c., after notice	0 5 0	0 5 0
Peter Birmingham...	Swan Court, Market Street .....	Ditto	Withdrawn	.....
		Carried forward.....£	1 15 0	1 12 0

PROSECUTIONS FOR OFFENCES, WITH RESULTS—continued.

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed or otherwise dealt with	Amount of Costs ordered to be Paid
Eli Jaques .....	Back Ducie Street .....	Neglecting to cleanse and purify workshop, &c., after notice	£ 1 15 0 Withdrawn	£ 1 12 0 (removed)
John Kilbeg .....	14, Ardwick Green .....	ditto	0 10 0	0 8 6
Marks Josephson ...	119, Derby Street, Cheetham .....	ditto	2 0 0	0 8 6
Henry Tomlin .....	9, Rosamond Street West.....	ditto	Withdrawn	(removed)
Barnett Ambler.....	4, Little Newton Street .....	ditto	Do.	Do.
William Lomax.....	75, Oxford Street, City .....	ditto	Do.	Do.
Gabriel Chadwick...	6, Cannon Street.....	ditto	Do.	0 3 0
Thomas Bennion ...	Crowther's Yard, Pin Mill Brow.....	ditto	(work done) Withdrawn	0 3 0
Arthur T. Hayward	67 Cumberland Street.....	ditto	(work done)	0 3 0
Sidney Booth .....	Medlock Street, C-on-M.....	ditto	Do.	0 3 0
Marks Cohen .....	Behind 44, Cheetham Street .....	ditto	Do.	0 3 0
Archibald Muirhead	12, John Dalton Street.....	ditto	Do.	0 3 0
Jacob Shirriotta ...	7, Scotland Court .....	ditto	Do.	0 3 0
William Edwards ...	Bank Street, Higher Openshaw .....	ditto	Do.	0 3 0
Samuel Wynn .....	129, Stockport Road .....	ditto	Do.	0 3 0
Harris Payman .....	46, Moreton Street .....	ditto	Do.	.....
Barnett Simpson ...	1 Monsell Street, Cheetham .....	ditto	Do.	0 3 0
		Neglecting to cleanse, purify, &c., closet of workshop after notice	Order of abatement made	0 3 7 6
		Carried forward .....£	4 5 0	4 3 6



PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed or otherwise dealt with	Amount of Costs ordered to be Paid
Abraham Whyman	1, Monsell Street, Cheetham .....	Brought forward..... Neglecting to cleanse, purify, &c., closet of workshop after notice	£ 4 s. 0 d. Order of abatement made	£ 4 s. 3 d. 6 6
Moses Franks .....	12 Robert Street .....	Ditto	Do.	0 7 6
Abraham Wheeler...	Ditto .....	Ditto	Do.	0 7 6
Moses Goodman ...	Ditto .....	Ditto	Do.	0 7 6
Isaac Goldberg .....	Ditto .....	Ditto	Do.	0 7 6
Morris Goldberg ...	Ditto .....	Ditto	Do.	0 7 6
Israel Norr .....	Ditto .....	Ditto	Do.	0 7 6
James Holland .....	Ditto .....	Ditto	Do.	0 7 6
Robert Somerville...	122, Great Ancoats Street .....	Neglecting to remove an accumulation of offensive matter from yard of workshop after notice	Do.	0 7 6
Louisa Lang .....	12, Sherbourne Street .....	Neglecting to abate overcrowding of work- shop after notice	0 10 s. 6 d. Order of abatement made	0 8 6 .....
Edwin Sutton .....	23, Cross Street, Shudehill .....	Ditto	Do.	0 7 6
Joseph T. Roberts..	13, Watling Street, Shudhill .....	Neglecting to ventilate workshop after notice	Withdrawn (work done)	.....
Louis Harris .....	23, Irwell Street, Cheetham.....	Ditto	Do.	.....
	Carried forward .....	£	4 15 6	7 19 6

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed or otherwise dealt with	Amount of Costs ordered to be Paid
Louis Goodfield ...	22, Cheetwood Street, Cheetham.....	Neglecting to ventilate workshop after notice	£ 4 s. 15 d. 6 Withdrawn (work done)	£ 7 s. 19 d. 6
John Thompson ...	66a, Back Grafton Street, Chorlton-upon-Medlock	Having his bakehouse in a dirty condition	0 5 0	0 5 0
Jacob Kafkervitch...	2a, Scotland, Red Bank .....	Ditto	0 10 6	0 8 6
Sarah Gordon .....	94, Cheetham Hill Road.....	Ditto	Withdrawn	.....
Jacob Marcovitch...	3, Nightingale Street .....	Ditto	(work done)	.....
Minnie Cornofski ...	22, Bury New Road.....	Ditto	0 10 6	0 8 6
Meyer Solomon ...	41, Lord Street, Cheetham .....	Ditto	0 5 0	0 5 0
Henry Woodhouse...	1, Kay Street, Openshaw.....	Ditto	0 15 0	0 8 6
Jacob Kafkervitch...	2a, Scotland, Red Bank .....	Ditto	Withdrawn	.....
Joseph Copeland ...	4a, Pimblett Street .....	Ditto	(work done)	.....
Eli Morris .....	11, Lord Street, Red Bank .....	Ditto	0 15 0	0 8 6
R. Sharrocks & Sons	12 and 14, Rusholme Road .....	Ditto	Withdrawn (work done)	.....
		TOTAL.....£	9 1 6	11 0 6

## SMOKE NUISANCES.

For the abatement of smoke nuisances, the four Inspectors appointed specially for this work have taken 2,139 timed observations of half-an-hour each, with the result that 190 notices for the abatement of nuisances have been served. In addition to which, proceedings before the Magistrates have been ordered in 143 cases out of 215 offences reported. These cases were disposed of as follows :—

145 were summoned before the Justices, in 77 of which fines were imposed amounting to £183 18s. od., and costs £32 17s. 6d.

4 were ordered to pay costs only.

50 orders of abatement were granted and served, 1 case was adjourned, and 13 cases were excused, dismissed, or withdrawn.

Much attention during the past year, as will be seen by the above, has been given to the nuisance caused by the emission of black smoke, not only from the furnaces connected with boilers in mills, warehouses, and other works, but also from chemical and other industries, and the efforts made have already resulted in a considerable reduction of the nuisance. It is hoped that the proceedings now pending against certain grave offenders will have a further beneficial effect.

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## FOOD AND DRUGS ACTS AND MARGARINE ACT.

Under these Acts, the two Inspectors specially appointed have purchased for analysis 1,587 samples. Of these, 49 only were adulterated, viz. :—

Butter	...	...	...	...	...	...	...	...	21
Coffee	...	...	...	...	...	...	...	...	1
Milk	...	...	...	...	...	...	...	...	21
Mustard	...	...	...	...	...	...	...	...	3
Spice	...	...	...	...	...	...	...	...	1
Spirits	...	...	...	...	...	...	...	...	2

46 summonses were issued. In 32 cases fines were imposed amounting in the aggregate to £42 8s. 6d., and the costs £48 15s.

12 summonses were dismissed or withdrawn.

2 were ordered to pay costs only.



### CANAL BOATS ACTS.

The number of canal boats on the register is 414.

The number inspected was 2,011, resulting in 4 infringements of the Act being discovered, which were referred to the Justices to be dealt with: in each case fines were imposed amounting in the aggregate to £1, and the costs £2 2s. 6d. In addition to the above, 123 ships were also inspected and found satisfactory.

188 caution notices were sent to the owners and masters.

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### OFFENSIVE TRADES.

The number of offensive trades on the register is 267. These have been placed under close supervision, and periodical visits paid.

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### UNHEALTHY DWELLINGS.

During the year, 1,063 houses were certified to be dealt with by the Sanitary Committee.

1,000 of these were ordered to be closed.

A large proportion of these houses have since had structural alterations made to them which satisfied the requirements of the Medical Officer of Health, and have since been allowed to be reinhabited.

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### CLOSET ACCOMMODATION TO WORKSHOPS, WAREHOUSES, &c.

99 properties were reported as being deficient in closet accommodation, and 53 public and beer houses as being without or having unsatisfactory urinal accommodation.

In a large number of cases the necessary accommodation has been provided, and in others orders have been made to provide the necessary accommodation, or the reports are under consideration.

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### PARTICULARS RELATING TO THE OPERATIONS OF THE CLEANSING COMMITTEE.

Cleansing Department,  
Town Hall, Manchester,  
September 2nd, 1898.

Dear Sir,—In response to your request, I now have pleasure in giving you the following information:—There are within the City, pail-closets, 76,863; midden privies, 22,990; wet middens, 12,271; dry middens, 743; water-closets, 32,201; and cesspools, 90. The pail-closets are systematically

emptied at regular intervals—once, twice, or thrice weekly, as necessity demands. The privies are emptied as required. The contents of the pail-closets are taken to Holt Town and Water Street. At Holt Town the fæcal matter is dried into concentrated manure. The dry refuse is consumed in the Galloway boilers, and generates the steam required for working the machinery. The worthless fine ash, which cannot be consumed, is deposited at the nearest tip at Clayton Bridge. The privy refuse and fæcal matter which is taken to Water Street is sent away in its crude state as nightsoil to Carrington Moss and to farmers in Cheshire. Dry combustible matter is passed into the destructor furnaces or under the Galloway boilers at Water Street, and there destroyed. A large quantity of fine ash at Water Street is used as an absorbent for the fæcal matter from the pail-closets.

The market garbage, of which we have about 5,000 tons per annum, is carted to Water Street, and there loaded into boats and sent away to farmers and Carrington Moss immediately. Slaughter-house refuse is collected from the abattoirs and private slaughter-houses and sent to Holt Town, where it is passed through dryers, and evaporated to dryness; the dry material is then added to our concentrated manure. Street sweepings are generally deposited at the nearest depot, and there allowed to drain; the dry sweepings are then carted to the nearest tip.

We have within the City over 60 destructor furnaces of different kinds. Last year we made close upon 20,000 tons of mortar from the clinker which we obtained from the destructor furnaces.

We now employ nearly 100 “orderly” boys; they collect horse-droppings and litter from the street, and deposit the same in the bins which are fixed in the footpaths. The contents of the bins are removed daily, and taken to the nearest depot.

With regard to the removal of the contents of the pails from Typhoid Fever cases: Acting upon instructions we received from you, special pails and lids are supplied for all cases of Enteric Fever; labels are attached to the pails, asking the occupants to use disinfectants, which are supplied with the pails; the pails are left in the yard, and not placed in the ashplace. The occupants of the houses are requested to use this special pail for the reception of the fæcal matter and washings from the patient only. The pails are removed periodically in a specially-constructed vehicle, and taken to Holt Town depot, where the contents are destroyed.

With regard to the cleansing of passages, we have a staff of about 50 men engaged specially upon this work. They regularly, at least once a week, cleanse the back passages in certain districts, and during last year 344,588 swillings and cleansings were effected in courts and passages.



During the year 66,970 barrels of water were used in degging the streets, and 279,086 grids were unstopped.

During the seven years we have deposited upon the various tips within the City the following quantities of material, viz. :—In 1892, 99,866 tons; 1893, 109,078 tons; 1894, 103,949 tons; 1895, 113,836 tons; 1896, 107,883 tons; 1897, 99,658 tons; and in 1898, 96,635 tons. The bulk of this material was deposited on the tips at Clayton and Harpurhey. It is composed principally of dry ashes, street sweepings, and bell-dust. Occasionally the contents of dry middens are sent there. During last year 57,020 tons of material was sent to Carrington.

Yours faithfully,

R. D. CALLISON,

*Indoor and Estates Superintendent.*

Dr. Niven,

Medical Officer of Health,

Town Hall, Manchester.

ABATTOIRS,

Aug. 30th, 1898.

Sir,—I herewith submit the following report with reference to unwholesome food condemned in this City under the Public Health Act, 1875, during the year ending December, 1897 :—

MEAT.

Beef .....	136,666 lbs.	Fish .....	152,151 lbs.
Mutton.....	29,615 „	Shell-fish .....	64,357 „
Veal .....	2,842 „		<u>216,508 lbs.</u>
Pork.....	21,067 „		
Venison.....	1,080 „	Game.....	1,286 head
	<u>191,270 lbs.</u>	Poultry .....	1,897 „
		Rabbits .....	8,601 „

MISCELLANEOUS.

Apples .....	2 barrels	Bananas .....	39 crates
„ .....	498 lbs.	Cocoanuts.....	608 nuts
Cherries .....	90 baskets	„ .....	11½ cwt.
Pears .....	57 boxes	Mushrooms .....	1 barrel
Lemons.....	2 cases	„ .....	2 packages
Tomatoes.....	29 boxes	Potatoes.....	32 barrels
Fruit (mixed).....	83 lbs.	Cauliflowers .....	90 head
Plums.....	22 baskets	Onions .....	40 bags
„ .....	119 lbs.	Cabbages .....	6 crates
„ .....	1 peck	Lettuce .....	22 crates



The number of carcasses, portions of carcasses, consignments of fish, etc. condemned during the year has been 1,840, and from the following causes :—

Decomposing .....	1,285	Jaundice .....	3
Tuberculosis .....	232	Pyæmia .....	3
Smothered .....	59	Braxy.....	2
Inflammation .....	45	Pleurisy .....	2
Dropsy .....	44	Actinomycosis .....	2
Unmarketable .....	40	Unseasonable .....	1
Injured.....	40	Purpura .....	1
Parturient Fever .....	20	Rheumatism .....	1
Abcesses .....	17	Tumours .....	1
Hydatid Disease .....	7	Anthrax.....	1
Fever .....	7	Parturient Apoplexy.....	1
Emaciation .....	6	Peritonitis .....	1
Choked .....	5	Nephritis .....,.....	1
Liver Rot .....	4	Black Quarter .....	1
Unclean (fish) .....	3	Œdema .....	1
Swine Fever.....	3	Congestion .....	1

Of the meat, fish, &c., there was condemned :—

In the Abattoirs and Carcase Markets .....	132,922 lbs.
„ Pig Market.....	11,562 „
„ Private Slaughter-houses .....	17,217 „
„ Railway Stations.....	53,388 „
„ Shops and Hawkers' Carts.....	625 „
„ Cold Air Stores .....	26,710 „
„ Rusholme Abattoirs .....	158 „
„ Farms .....,.....	696 „
„ Smithfield Market (Fish) .....	163,360 „
„ „ „ Venison .....	1,080 „

With the exception of 1,000 head of game and 5 turkeys, the game, poultry, and rabbits were condemned in the Wholesale Fish Market. The vegetables and fruit in Smithfield Fruit Market, shops, and hawkers' carts.

Of the above quantity of meat given as condemned in the Abattoirs and Carcase Market, 84,213 lbs. was dressed meat consigned from places other than the City—this meat being sent to the Abattoirs for inspection before being sold.

There are about 90 private slaughter-houses in use within the City, and they are visited as often as is possible by the Inspectors. During the year, 3,503 visits have been made to them, 12,825 carcasses seen therein, of which 53 were condemned as unfit for human food.

During the year, 248 special visits have been paid to the cowsheds in the City, 2,286 cattle examined in them, seven of which have been removed upon the advice of the Inspectors as being the subjects of Tuberculosis.

JAMES KING, M.R.C.V.S.  
Chief Inspector.

# TABLES.



TABLE A.—MANCHESTER, 1897.

CAUSES OF DEATH AT DIFFERENT LIFE PERIODS IN THE 52 WEEKS OF THE YEAR.  
PERSONS.—(MALES AND FEMALES.)

CAUSES OF DEATH	AGES AT DEATH													
	All Ages	UNDER 5 YEARS		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
All Causes .....	11990	3431	2032	289	154	234	258	666	951	1180	1192	1063	475	65
I. ZYMOTIC DISEASES.....	2,410	1020	961	83	21	26	29	55	56	48	47	48	12	4
II. PARASITIC DISEASES ...	6	6	...	...	...	...	...	...	...	...	...	...	...	...
III. DIETETIC DISEASES ...	57	4	...	...	...	...	...	3	13	22	10	5	...	...
IV. CONSTITUTIONAL DIS.:	2,205	213	241	61	48	90	113	299	384	354	252	132	17	1
V. DEVELOPMENTAL DIS.:	636	392	4	2	1	1	...	...	...	1	20	86	108	21
VI. LOCAL DISEASES .....	5,379	1041	705	117	69	104	106	272	439	675	807	716	295	33
VII. VIOLENCE .....	365	70	43	25	15	12	9	26	41	55	28	30	11	...
VIII. ILL-DEFINED CAUSES ...	932	685	78	1	...	1	1	11	18	25	28	46	32	6
<b>I.—Zymotic Diseases.</b>														
1. MIASMATIC DISEASES.														
Smallpox..														
{ Vaccinated .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
{ Unvaccinated .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
{ No Statement.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Chickenpox .....	5	2	3	...	...	...	...	...	...	...	...	...	...	...
Measles .....	628	142	457	27	1	...	1	...	...	...	...	...	...	...
Epidemic Rose Rash .....	2	...	1	1	...	...	...	...	...	...	...	...	...	...
Scarlet Fever.. .....	124	6	85	22	5	5	1	...	...	...	...	...	...	...
Typhus .....	2	...	...	...	...	...	...	...	...	...	1	1	...	...
Relapsing Fever .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Influenza .....	107	2	2	1	1	3	4	7	17	22	23	20	4	1
Whooping Cough .....	299	118	173	8	...	...	...	...	...	...	...	...	...	...
Mumps .....	1	...	1	...	...	...	...	...	...	...	...	...	...	...
Diphtheria .....	29	3	14	9	2	...	...	...	...	1	...	...	...	...
Membranous Croup .....	17	1	14	2	...	...	...	...	...	...	...	...	...	...
Cerebro-spinal Fever .....	1	...	...	...	1	...	...	...	...	...	...	...	...	...
Simple and Ill-defined Fever ...	2	...	...	1	...	...	...	...	...	...	...	1	...	...
Enteric Fever .....	95	...	4	8	9	16	11	23	13	7	3	1	...	...
Other Miasmatic Diseases .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. DIARRHOEAL DISEASES.														
Simple Cholera .....	31	11	9	2	...	...	1	...	2	3	2	1	...	...
Diarrhoea, Dysentery .....	933	679	194	1	...	1	...	1	7	6	15	18	8	3
3. MALARIAL DISEASES.														
Remittent Fever .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ague .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. ZOOGENOUS DISEASES.														



TABLE A, 1897—continued.

CAUSES OF DEATH	AGES AT DEATH													
	All Ages	UNDER 5 YEARS		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
III.—Dietetic Diseases.														
Starvation, Want of Breast Milk	5	4	...	...	...	...	...	...	1	...	...	...	...	...
Scurvy	1	...	...	...	...	...	...	...	...	...	1	...	...	...
Intem: { Chronic Alcoholism ...	47	...	...	...	...	...	...	2	11	20	9	5	...	...
	4	...	...	...	...	...	...	1	1	2	...	...	...	...
IV.—Constitutional Diseases.														
Rheum: Fev: Rheum: of Heart	40	...	1	4	6	6	3	10	4	3	1	2	...	...
Rheumatism	34	...	...	1	2	...	2	5	2	4	8	7	3	...
Gout	4	...	...	...	...	...	...	...	...	2	1	1	...	...
Rickets	35	11	24	...	...	...	...	...	...	...	...	...	...	...
Cancer	396	1	1	...	1	...	1	9	59	123	115	74	12	...
Tabes Mesenterica	120	67	47	5	1	...	...	...	...	...	...	...	...	...
Tuberc: Mening: (Hydroceph:)	168	57	79	16	6	2	3	3	2	...	...	...	...	...
Phthisis	1,139	16	20	19	17	72	95	259	295	200	108	35	2	1
Other forms of Tuberc: Scrofula	193	57	65	16	13	7	3	10	9	9	1	3	...	...
Purpura, Hæmorrhagic Diathesis	8	2	2	...	...	...	1	1	...	1	...	1	...	...
Anæmia, Chlorosis, Leucocy : .	34	2	2	...	2	2	2	2	8	5	6	3	...	...
Diabetes Mellitus	33	...	...	...	...	1	3	...	4	7	12	6	...	...
Other Constitutional Diseases...	1	...	...	...	...	...	...	...	1	...	...	...	...	...
V.—Developmental Diseases.														
Premature Birth	310	310	...	...	...	...	...	...	...	...	...	...	...	...
Atelectasis	10	10	...	...	...	...	...	...	...	...	...	...	...	...
Cyanosis	34	31	1	1	1	...	...	...	...	...	...	...	...	...
Spina Bifida	17	16	...	...	...	1	...	...	...	...	...	...	...	...
Imperforate Anus	3	3	...	...	...	...	...	...	...	...	...	...	...	...
Cleft Palate Harelip	5	4	1	...	...	...	...	...	...	...	...	...	...	...
Other Congenital Defects	21	18	2	1	...	...	...	...	...	...	...	...	...	...
Old Age	236	...	...	...	...	...	...	...	...	1	20	86	108	21
VI.—Local Diseases.														
1.—NERVOUS SYSTEM (DIS: OF).														
Inflam: of Brain or its Mem: ...	172	64	57	14	13	2	3	9	3	3	2	2	...	...
Apoplexy	244	5	...	...	1	1	1	5	12	45	73	69	32	...
Softening of the Brain	25	...	...	...	...	...	...	1	...	4	8	2	10	...
Hemiplegia, Brain Paralysis	125	1	...	1	1	...	2	2	7	14	37	43	14	3
Paralysis Agitans	4	...	...	...	...	...	...	...	...	1	1	1	1	...
Insanity, Gen: Par: of Insane...	141	...	...	...	...	...	...	8	30	24	30	27	19	3
Chorea	2	...	...	2	...	...	...	...	...	...	...	...	...	...
Epilepsy	40	...	1	1	...	6	4	6	9	7	3	2	1	...
Convulsions	213	177	33	3	...	...	...	...	...	...	...	...	...	...
Laryngismus Stridulus	13	7	6	...	...	...	...	...	...	...	...	...	...	...
Idiopathic Tetanus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Paraplegia, Dis: of Spinal Cord	34	1	2	...	1	1	1	2	5	6	10	4	1	...
Other Diseases of Nervous Sys:	71	11	5	6	...	4	2	6	9	17	7	3	1	...
2. ORGANS OF SPECIAL SENSE (DISEASES OF).														
Otitis, Otorrhœa	16	1	5	1	2	3	2	...	1	...	1	...	...	...
Epistaxis and Disease of Nose	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Ophthalmia and Disease of Eye.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. CIRCULATORY SYS: (DIS: OF)														
Endocarditis	16	...	1	...	...	3	3	2	3	2	1	1	...	...
Valvular Disease	168	...	...	7	10	11	5	21	28	34	26	21	5	...
Pericarditis	13	1	1	...	1	...	...	3	1	4	1	...	1	...
Hypertrophy of Heart	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Angina Pectoris	12	...	...	...	...	...	...	...	...	5	2	5	...	...
Syncope	67	...	...	...	...	...	...	3	3	9	17	16	14	5





TABLE A, 1897—concluded.

CAUSES OF DEATH	AGES AT DEATH													
	All Ages	UNDER 5 YEARS		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
8. REPRODUCTIVE SYSTEM (DIS: OF)— <i>continued.</i>														
Pelvic Abscess .....	6	...	...	...	...	1	2	...	2	...	1	...	...	...
Perineal Abscess .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dis: of Testes, Penis, Scrotum, &c.	10	1	1	...	...	...	1	3	1	1	1	...	1	...
(b) Parturition, Disease of:														
Abortion, Miscarriage .....	2	...	...	...	...	...	...	2	...	...	...	...	...	...
Puerperal Mania .....	2	...	...	...	...	...	...	1	1	...	...	...	...	...
Puerperal Convulsions .....	2	...	...	...	...	...	1	1	...	...	...	...	...	...
Placenta Prævia, Flooding .....	8	...	...	...	...	...	4	2	2	...	...	...	...	...
Phlegmasia Dolens .....	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Other Accidents of Childbirth...	9	...	...	...	...	...	2	4	3	...	...	...	...	...
9. LOCOMOTOR SYS: (DIS: OF).														
Caries, Necrosis .....	12	...	1	3	3	1	...	3	1	...	...	...	...	...
Arthritis, Ostitis, Periostitis.....	3	1	...	...	1	...	...	...	...	1	...	...	...	...
Other Dis: of Locom: Sys: ...	3	1	...	1	...	1	...	...	...	...	...	...	...	...
10. INTEGUMENTARY SYSTEM (DISEASES OF).														
Carbuncle .....	3	...	...	...	...	...	...	...	...	1	1	1	...	...
Phlegmon, Cellulitis .....	5	1	...	...	...	...	...	...	...	1	2	1	...	...
Lupus .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ulcer, Bedsore .....	5	...	...	...	...	...	...	...	1	...	...	3	1	...
Eczema .....	4	2	1	...	...	...	...	...	...	...	1	...	...	...
Pemphigus .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Dis: of Integ: Sys: .....	5	4	...	...	...	...	1	...	...	...	...	...	...	...
VII.—Violence.														
1. ACCIDENT OR NEGLIGENCE.														
Fractures, Contusions .....	127	1	7	6	4	2	5	14	18	24	16	23	7	...
Gunshot Wounds .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cut, Stab .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Burn, Scald .....	61	3	25	16	...	2	1	...	4	5	2	2	1	...
Poison .....	10	...	1	...	...	1	1	2	...	3	1	...	1	...
Drowning .....	40	...	9	2	9	3	1	3	5	7	1	...	...	...
Suffocation.....	75	65	...	...	...	1	...	1	6	1	1	...	...	...
Otherwise .....	5	...	1	1	...	1	...	...	1	...	...	1	...	...
2. HOMICIDE.														
Murder, Manslaughter.....	8	1	...	...	...	...	1	1	5	...	...	...	...	...
3. SUICIDE.														
Gunshot Wounds .....	1	...	...	...	1	...	...	...	...	...	...	...	...	...
Cut, Stab .....	7	...	...	...	...	...	...	...	2	2	1	1	1	...
Poison.....	17	...	...	...	1	1	...	4	...	6	3	1	1	...
Drowning .....	1	...	...	...	...	...	...	...	...	...	1	...	...	...
Hanging.....	10	...	...	...	...	1	...	...	...	6	1	2	...	...
Otherwise .....	3	...	...	...	...	...	...	1	...	1	1	...	...	...
4. EXECUTION :—Hanging.														
VIII.—Ill-defined and not Specified Causes.														
Dropsy .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Debility, Atrophy, Inanition ...	689	590	55	...	...	...	...	...	2	...	2	17	19	4
Mortification .....	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Tumour .....	2	1	...	...	...	...	...	...	...	...	1	...	...	...
Abscess .....	5	1	...	...	...	...	...	...	1	...	1	1	1	...
Hæmorrhage ..	3	2	...	...	...	...	...	...	...	...	...	1	...	...
Sudden (cause unascertained)...	127	43	19	...	...	1	1	2	8	16	16	10	9	2
Other Ill-def: not spec: causes.	105	48	4	1	...	...	...	8	7	9	8	17	3	...



TABLE B.

1897.—SUMMARY OF TABLE A, COMPARED WITH AVERAGE DEATHS IN GROUPS  
OF DISEASES, 1891-96.

	DEATHS	
	1897	Average 1891-96
I. Specific Febrile, or Zymotic Diseases :		
1. Miasmatic Diseases .....	1,312	1,273
2. Diarrhoeal „ .....	964	610
3. Malarial „ .....	...	...
4. Zoogenous „ .....	1	2
5. Venereal „ .....	53	74
6. Septic „ .....	80	84
II.—Parasitic Diseases.....	6	7
III.—Dietetic Diseases .....	57	64
IV.—Constitutional Diseases .....	2,205	2,060
V.—Developmental Diseases ..	636	627
VI.—Local Diseases :		
1. Diseases of Nervous System .....	1,084	1,260
2. Diseases of Organs of Special Sense .....	17	21
3. Diseases of Circulatory System .....	932	914
4. Diseases of Respiratory System .....	2,416	2,866
5. Diseases of Digestive System .....	552	556
6. Diseases of Lymphatic System and Ductless Glands .....	10	11
7. Diseases of Urinary System .....	275	264
8. Diseases of Reproductive System :		
(a) Diseases of Generative Organs...	29	29
(b) Diseases of Parturition .....	24	53
9. Diseases of Locomotor System .....	18	40
10. Diseases of Integumentary System.....	22	24
VII.—Violence :		
1 Accident or Negligence .....	318	351
2. Homicide . .....	8	7
3. Suicide .....	39	40
4. Execution :—Hanging .....	...	...
VIII.—Ill-defined and not Specified Causes...	932	898
TOTAL .....	11,990	12,135

TABLE C.—MANCHESTER, 1897.  
CAUSES OF DEATHS AT DIFFERENT LIFE PERIODS—MALES.

Classes	CAUSES OF DEATH	All Ages Total	AGES AT DEATH—IN YEARS												
			UNDER 5 YEARS		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upward
			0 to 1	1 to 5											
	All Causes .....	6263	1871	1048	121	88	130	142	360	501	665	623	498	193	23
I.	Smallpox .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Measles .....	317	82	222	13	...	...	...	...	...	...	...	...	...	...
	Scarlet Fever .....	64	5	44	7	4	4	...	...	...	...	...	...	...	...
	Typhus Fever.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Whooping Cough .....	147	58	84	5	...	...	...	...	...	...	...	...	...	...
	Diphtheria .....	15	2	7	4	1	...	...	...	...	1	...	...	...	...
	Membranous Croup .....	9	1	7	1	...	...	...	...	...	...	...	...	...	...
	Ill-defined Fever.....	1	...	...	...	...	...	...	...	...	...	...	...	...	...
	Enteric Fever .....	54	...	2	4	3	10	6	14	8	5	1	1	...	...
	Influenza .....	53	1	1	1	1	2	2	6	8	10	12	7	2	...
	Simple Cholera .....	16	4	6	...	...	...	1	...	...	2	2	1	...	...
	Diarrhoea, Dysentery.....	458	338	96	...	...	...	...	...	4	2	10	7	1	...
	Venereal Affections.....	35	26	1	...	...	...	...	1	2	4	...	1	...	...
	Erysipelas .....	12	3	...	...	...	...	2	2	...	1	2	2	...	...
	Pyæmia .....	8	...	1	...	...	...	...	...	3	2	...	2	...	...
	Puerperal Fever ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Other Zymotics .....	6	3	2	...	1	...	...	...	...	...	...	...	...	...
II.	Parasitic Diseases .....	2	2	...	...	...	...	...	...	...	...	...	...	...	...
III.	Dietetic Diseases, Intemperance	29	3	...	...	...	...	...	2	5	11	6	2	...	...
IV.	Rheumatic Fever.....	19	...	...	1	3	1	1	7	3	...	1	2	...	...
	Rickets .....	20	6	14	...	...	...	...	...	...	...	...	...	...	...
	Cancer .....	152	1	1	...	...	...	...	4	19	48	52	23	4	...
	Tabes Mesenterica.....	67	44	22	1	...	...	...	...	...	...	...	...	...	...
	Hydrocephalus .....	95	35	47	8	3	...	1	...	...	...	...	...	...	...
	Phthisis.....	703	9	9	3	10	40	59	145	174	142	81	29	1	1
	Scrofula, Tuberculosis .....	105	31	34	6	6	5	2	8	5	6	1	1	...	...
	Constitutional Diseases (other)...	58	1	2	1	2	1	4	4	6	12	15	9	1	...
V.	Premature Birth.....	186	186	...	...	...	...	...	...	...	...	...	...	...	...
	Malform. Develop. Dis. (other)...	51	45	3	2	...	1	...	...	...	...	...	...	...	...
	Old Age .....	89	...	...	...	...	...	...	...	...	...	4	30	47	8
	Apoplexy, Hemiplegia .....	164	3	...	...	1	...	3	6	6	31	48	45	20	1
	Epilepsy .....	26	...	1	1	...	4	1	2	8	5	3	1	...	...
	Convulsions .....	116	99	16	1	...	...	...	...	...	...	...	...	...	...
	Brain and Nervous Dis. (other)...	241	48	43	8	9	4	3	12	25	26	29	24	10	...
VI.	Heart Diseases .....	427	3	2	10	9	9	11	36	48	94	100	81	23	1
	Croup .....	9	1	7	1	...	...	...	...	...	...	...	...	...	...
	Bronchitis .....	520	170	75	3	1	2	2	5	17	46	79	90	25	5
	Pneumonia .....	691	140	173	16	9	20	20	42	72	70	64	48	16	1
	Respiratory Diseases (other).....	81	12	13	3	2	2	2	10	5	11	13	6	2	...
	Digestive Organs (Diseases of)...	271	86	34	6	2	8	8	13	18	37	29	23	5	2
	Urinary Organs (Diseases of) ...	159	1	4	4	2	1	4	10	19	39	37	27	11	...
	Reproductive Organs (Dis. of)...	8	...	1	...	...	1	...	...	2	1	2	...	1	...
	Local Diseases (other) .....	39	6	7	1	4	5	3	4	2	3	3	1	...	...
	Violence .....	226	31	26	9	15	9	6	19	31	39	19	14	8	...
VIII.	Marasmus, Atrophy .....	378	333	29	...	...	...	...	...	1	...	1	4	8	2
	Other Ill-defined Causes .....	136	52	12	1	...	1	1	8	9	17	9	16	8	2



TABLE D.—MANCHESTER, 1897.

CAUSES OF DEATHS AT DIFFERENT LIFE PERIODS—FEMALES.

		FEMALES.														
Classes	CAUSES OF DEATH	All Ages Total	AGES AT DEATH—IN YEARS													85 and upwards
			UNDER 5 YEARS		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85		
			0 to 1	1 to 5												
	All Causes .....	5727	1560	984	168	66	104	116	306	450	515	569	565	282	42	
I.	Smallpox .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	Measles.....	311	60	235	14	1	...	1	...	...	...	...	...	...	...	
	Scarlet Fever .....	60	1	41	15	1	1	1	...	...	...	...	...	...	...	
	Typhus Fever.....	2	...	...	...	...	...	...	...	...	...	...	...	...	...	
	Whooping Cough .....	152	60	89	3	...	...	...	...	...	...	1	1	...	...	
	Diphtheria .....	14	1	7	5	1	...	...	...	...	...	...	...	...	...	
	Membranous Croup .....	8	...	7	1	...	...	...	...	...	...	...	...	...	...	
	Ill-defined Fever.....	1	...	...	1	...	...	...	...	...	...	...	...	...	...	
	Enteric Fever .....	41	...	2	4	6	6	5	9	5	2	2	...	...	...	
	Influenza .....	54	1	1	...	...	1	2	1	9	12	11	13	2	1	
	Simple Cholera .....	15	7	3	2	...	...	...	...	2	1	...	...	...	...	
	Diarrhoea, Dysentery.....	475	341	98	1	...	1	...	1	3	4	5	11	7	3	
	Venereal Affections.....	18	17	1	...	...	...	...	...	...	...	...	...	...	...	
	Erysipelas.....	16	8	1	1	1	...	...	2	...	2	...	1	...	...	
	Pyæmia.....	6	1	...	...	1	...	1	...	2	...	1	...	...	...	
	Puerperal Fever .....	37	...	...	...	...	1	8	19	9	...	...	...	...	...	
	Other Zymotics .....	5	...	3	1	...	...	...	...	1	...	...	...	...	...	
II.	Parasitic Diseases .....	4	4	...	...	...	...	...	...	...	...	...	...	...	...	
III.	Dietetic Diseases, Intemperance .....	28	1	...	...	...	...	...	1	8	11	4	3	...	...	
IV.	Rheumatic Fever .....	21	...	1	3	3	5	2	3	1	3	...	...	...	...	
	Rickets .....	15	5	10	...	...	...	...	...	...	...	...	...	...	...	
	Cancer .....	244	...	...	...	1	...	1	5	40	75	63	51	8	...	
	Tabes Mesenterica .....	53	23	25	4	1	...	...	...	...	...	...	...	...	...	
	Hydrocephalus .....	73	22	32	8	3	2	2	3	1	...	...	...	...	...	
	Phthisis.....	436	7	11	16	7	32	36	114	121	58	27	6	1	...	
	Scrofula, Tuberculosis .....	88	26	31	10	7	2	1	2	4	3	...	2	...	...	
Constitutional Diseases (other)...	56	3	2	...	2	2	4	4	9	7	12	9	2	...		
V.	Premature Birth .....	124	124	...	...	...	...	...	...	...	...	...	...	...	...	
	Malform. Develop. Dis. (other).. Old Age .....	39 147	37 ...	1 ...	...	1 ...	...	...	...	...	...	...	...	...	...	
VI.	Apoplexy, Hemiplegia .....	205	3	...	1	1	1	...	1	13	28	62	67	26	2	
	Epilepsy .....	14	...	...	...	...	2	3	4	1	2	...	1	1	...	
	Convulsions .....	97	78	17	2	...	...	...	...	...	...	...	...	...	...	
	Brain and Nervous Dis. (other)...	221	35	27	14	5	3	3	14	22	29	29	15	22	3	
	Heart Diseases .....	505	4	2	6	11	17	10	35	60	101	116	91	44	8	
	Croup .....	7	1	3	3	...	...	...	...	...	...	...	...	...	...	
	Bronchitis.....	579	140	75	6	1	1	...	7	21	52	97	112	59	8	
Pneumonia .....	473	115	146	13	6	13	12	27	37	37	36	27	2	2		
Respiratory Diseases (other).....	56	4	14	4	...	...	1	...	9	3	6	7	8	...		
VII.	Digestive Organs (Diseases of)...	281	84	37	8	3	2	3	20	22	33	32	24	13	...	
	Urinary Organs (Diseases of) ...	116	1	6	2	1	6	7	9	19	21	17	21	6	...	
	Reproductive Organs (Dis. of)...	45	1	...	...	...	2	10	15	10	3	3	1	...	...	
	Local Diseases (other) .....	28	6	2	4	2	1	...	...	3	3	2	4	1	...	
VIII.	Violence .....	139	39	17	16	...	3	3	7	10	16	9	16	3	...	
VIII.	Marasmus, Atrophy .....	311	257	26	...	...	...	...	...	1	...	1	13	11	2	
	Other Ill-defined Causes .....	107	43	11	...	...	...	...	3	7	8	17	13	5	...	



TABLE E.

CITY OF MANCHESTER, 1897.—CAUSES OF DEATH IN INFANCY AND CHILDHOOD.

CAUSES OF DEATH	UNDER ONE YEAR			Total under One Year	ONE AND UNDER FIVE YEARS				Total under Five Years
	Under 3 months	3-6 months	6-12 months		1-	2-	3-	4-	
All Causes .....	1,451	748	1,232	3,431	1,279	398	215	140	5,463
Measles .....	1	8	133	142	278	101	55	23	599
Scarlatina .....	...	1	5	6	22	28	15	20	91
Whooping Cough .....	14	25	79	118	105	38	22	8	291
Diphtheria..... (Memb: Croup)	...	...	4	4	9	11	3	5	32
Fever (various forms) .....	...	...	...	...	1	1	...	2	4
Diarrhoea .....	163	212	304	679	176	11	5	2	873
Syphilis .....	22	19	2	43	2	...	...	...	45
Tabes Mesenterica .....	16	14	37	67	32	8	4	3	114
Hydrocephalus .....	6	14	37	57	33	25	13	8	136
Scrofula (other).....	12	16	45	73	48	14	16	7	158
Premature Birth .....	307	3	...	310	...	...	...	...	310
Convulsions .....	109	28	40	177	25	6	1	1	210
Brain Diseases (other) .....	15	20	54	89	39	14	12	6	160
Lung Diseases .....	150	141	292	583	341	84	48	33	1,089
Teething .....	...	6	35	41	28	1	...	...	70
Atrophy, Marasmus .....	383	137	70	590	47	5	...	3	645
Found Dead in Bed .....	63	24	7	*94	...	3	...	...	97
Suffocation .....	3	1	...	4	...	...	...	...	4
Violence (other forms) .....	...	3	2	5	11	13	12	7	48
Ill-defined Causes.....	35	9	18	62	13	5	...	2	82
Unclassified .....	152	67	68	287	69	30	9	10	407

\* 61 of these were "Found dead in bed, suffocated."

TABLE F, 1871 TO 1897.—MANCHESTER.—ESTIMATED POPULATIONS. ANNUAL RATES OF MARRIAGES, BIRTHS, AND DEATHS  
(a) from all causes, and (b) from specified causes; also the percentages to total deaths of Inquest Cases, and of Deaths in Public Institutions.

YEARS	Estimated Populations — (Mean)	Persons Married	ANNUAL RATES PER 1,000 PERSONS LIVING													PERCENTAGES TO TOTAL DEATHS		YEARS
			Births	Deaths (All Causes)	Smallpox	Measles	Scarlet Fever	Diphtheria	Whooping Cough	Typhus Fever	Enteric Fever	Simple Continued Fever	Diarrhoea and Dysentery	English Cholera	Violence	Inquest Cases	Deaths in Public Institutions	
Quinquennial Averages { 1871-75 1876-80 1881-85 1886-90 1891-95	477,344 509,802 542,746 575,630 517,801	24.6 18.6 17.9 16.6 16.9	38.9 38.7 35.1 33.4 33.2	28.3 26.2 23.6 24.6 23.6	0.26 0.24 0.04 0.02 0.03	0.64 0.53 0.71 0.83 0.62	1.08 1.07 0.48 0.50 0.26	0.08 0.13 0.10 0.32 0.27	0.78 0.84 0.68 0.54 0.64	0.14 0.08 0.05 0.02 0.00	0.43 0.29 0.20 0.30 0.24	0.21 0.11 0.03 0.01 0.01	1.92 1.22 0.96 1.06 1.14	0.03 0.04 0.03 0.02 0.05	0.94 0.89 0.72 0.78 0.77	7.2 7.5 7.0 6.9 7.1	13.4 14.3 15.9 17.7 19.2	1871-75 1876-80 1881-85 1886-90 1891-95
Ave. 1871-95 25 yrs.	524,664	18.9	35.8	25.3	0.11	0.66	0.68	0.18	0.70	0.06	0.29	0.07	1.26	0.03	0.82	7.1	16.1	1871-95 Ave. 25 yrs.
1871	464,866	24.2	38.1	29.3	0.72	0.84	0.71	0.04	0.61	0.20	0.45	0.35	2.58	0.02	0.90	6.3	13.7	1871
1872	471,023	25.8	39.3	27.3	0.32	0.33	1.02	0.09	1.22	0.17	0.40	0.17	2.07	0.04	0.90	6.9	13.5	1872
1873*	477,261	24.8	38.3	28.0	0.08	0.85	1.43	0.05	0.38	0.15	0.46	0.20	1.92	0.05	0.83	7.3	12.8	1873*
1874	483,582	23.8	39.3	28.7	0.05	0.62	1.33	0.07	0.83	0.08	0.39	0.19	1.71	0.01	0.94	7.3	13.5	1874
1875	489,987	24.2	39.5	28.4	0.11	0.54	0.92	0.14	0.88	0.11	0.44	0.12	1.32	0.01	1.12	8.4	13.3	1875
1876	496,476	20.2	40.0	28.0	0.80	0.65	1.13	0.10	0.81	0.16	0.42	0.17	1.50	0.02	1.05	7.4	14.4	1876
1877	503,051	19.8	39.5	26.1	0.36	0.59	1.05	0.13	0.84	0.11	0.29	0.12	0.82	0.01	0.86	7.9	14.9	1877
1878	509,714	18.8	39.7	26.8	0.01	0.45	1.07	0.14	0.68	0.06	0.31	0.10	1.42	0.07	0.91	7.6	14.4	1878
1879*	516,464	16.8	37.3	25.2	0.00	0.35	1.07	0.13	1.09	0.02	0.18	0.07	0.62	0.01	0.81	7.3	14.2	1879*
1880	523,304	17.2	36.9	25.0	0.01	0.63	1.03	0.14	0.76	0.04	0.26	0.07	1.73	0.09	0.80	7.1	13.7	1880
1881	530,051	17.8	35.9	22.8	0.03	0.29	0.34	0.09	0.71	0.03	0.17	0.06	0.73	0.02	0.84	8.1	15.9	1881
1882	536,324	18.8	35.7	24.0	0.05	0.89	0.34	0.11	0.87	0.10	0.25	0.04	1.00	0.03	0.67	7.2	14.5	1882
1883	542,671	17.8	34.9	24.4	0.01	0.71	0.81	0.11	0.62	0.05	0.20	0.03	0.95	0.03	0.73	7.0	15.5	1883
1884*	549,093	18.0	34.4	23.4	0.01	0.57	0.74	0.08	0.49	0.03	0.19	0.03	1.46	0.05	0.65	6.2	17.3	1884*
1885	555,591	17.0	34.8	23.6	0.08	1.08	0.17	0.10	0.71	0.04	0.17	0.01	0.64	0.02	0.69	6.4	16.4	1885
1886	562,166	16.4	34.7	24.1	0.00	0.27	0.41	0.15	0.57	0.03	0.29	0.01	1.34	0.04	0.71	7.2	17.0	1886
1887	568,819	16.6	33.9	25.4	0.01	1.54	0.63	0.23	0.50	0.02	0.31	0.01	1.19	0.02	0.77	6.9	16.1	1887
1888	575,550	16.0	33.3	23.3	0.07	0.27	0.42	0.36	0.79	0.02	0.33	0.02	0.71	0.01	0.74	6.7	18.3	1888
1889	582,362	17.0	33.1	24.2	0.00	1.22	0.45	0.51	0.45	0.01	0.31	0.01	1.00	0.03	0.89	6.5	18.2	1889
1890*	589,253	17.0	31.8	26.2	...	0.83	0.60	0.36	0.37	0.01	0.27	0.02	1.04	0.02	0.79	7.0	19.1	1890*
1891†	+ 508,673	17.2	33.8	26.0	...	0.43	0.22	0.25	1.02	0.01	0.37	0.01	0.81	0.04	0.79	6.8	18.4	1891†
1892†	+ 513,196	17.2	33.4	23.2	0.00	0.72	0.27	0.25	0.72	0.00	0.24	0.01	0.79	0.02	0.77	7.4	18.2	1892†
1893†	+ 517,760	16.0	33.4	24.3	0.09	0.57	0.27	0.35	0.46	0.00	0.25	0.01	1.75	0.10	0.76	6.9	18.7	1893†
1894†	+ 522,365	16.8	31.8	19.8	0.04	0.42	0.22	0.29	0.55	...	0.17	0.01	0.70	0.02	0.75	7.5	21.3	1894†
1895†	+ 527,010	17.4	33.4	24.5	0.00	0.96	0.33	0.21	0.47	...	0.18	0.01	1.66	0.06	0.80	6.9	19.2	1895†
1896†*	+ 531,697	18.3	32.8	22.0	...	1.05	0.37	0.15	0.66	0.00	0.22	0.01	1.04	0.02	0.71	7.4	19.7	1896†*
1897†	+ 536,426	17.8	32.9	22.4	...	1.17	0.23	0.08	0.56	0.00	0.18	0.00	1.74	0.06	0.68	6.6	20.0	1897†

† The facts for these years are from institutions.

\* The facts for these years are for 53 instead of 52 weeks; corrections have, therefore, been made in calculating the rates.  
† The populations and rates for the years subsequent to 1890, except the marriage rates, relate to the City of Manchester as enlarged by the Act of that year. The facts and rates for previous years are those for the three Unions of Manchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."  
‡ These figures include a proportion of the inmates of certain Extra-municipal Institutions which receive patients from the City of Manchester, and are therefore in excess of the estimates of the Registrar-General.



TABLE G, 1881 TO 1897.—MANCHESTER.  
ANNUAL RATES OF MORTALITY FROM CERTAIN CAUSES OF DEATH.

YEAR		ANNUAL RATES PER 1,000 PERSONS LIVING										RATES PER 1,000 BIRTHS	
		Cancer	Tabes Mesenterica	Phthisis	Other Tuber: Diseases	Diseases of Nervous System	Diseases of Circulatory System	Diseases of Respiratory System	Diseases of Digestive System	Diseases of Urinary System	Diseases of Generative System	Puerperal Fever	Childbirth
Quinquennial Periods	1881-85	0.50	0.35	2.42	0.57	3.28	1.37	5.41	1.23	0.48	0.08	3.03	1.99
	1886-90	0.64	0.36	2.24	0.59	3.09	1.73	5.76	1.23	0.61	0.08	3.22	2.13
	1891-95	0.62	0.22	2.09	0.75	2.50	1.75	5.56	1.07	0.52	0.07	2.75	3.42
Average 15 years	1881-95	0.58	0.31	2.25	0.63	2.96	1.61	5.58	1.18	0.54	0.08	3.00	2.52
	1881	0.48	0.28	2.46	0.52	3.33	1.19	5.57	1.24	0.39	0.07	3.15	1.37
	1882	0.44	0.40	2.41	0.61	3.35	1.34	5.33	1.19	0.45	0.08	3.92	1.62
	1883	0.54	0.34	2.54	0.59	3.32	1.33	5.66	1.20	0.50	0.06	2.27	1.58
	1884*	0.51	0.39	2.34	0.56	3.27	1.44	4.88	1.23	0.59	0.10	2.81	2.55
	1885	0.51	0.36	2.34	0.56	3.12	1.53	5.59	1.28	0.49	0.08	3.05	2.84
	1886	0.56	0.43	2.44	0.59	3.30	1.53	5.43	1.26	0.57	0.08	2.67	1.85
	1887	0.62	0.39	2.19	0.53	3.17	1.66	5.72	1.23	0.53	0.08	3.58	1.35
	1888	0.65	0.31	2.14	0.62	3.19	1.72	5.31	1.16	0.62	0.10	4.12	1.77
	1889	0.70	0.36	2.12	0.59	2.94	1.79	5.06	1.28	0.64	0.08	3.06	1.87
	1890*	0.65	0.33	2.33	0.62	2.87	1.93	7.28	1.22	0.66	0.08	2.68	3.89
	1891†	0.63	0.25	2.20	0.78	3.10	1.89	6.77	1.03	0.55	0.07	3.08	4.01
	1892†	0.61	0.21	2.05	0.75	2.44	1.84	5.44	1.14	0.53	0.05	3.79	4.54
	1893†	0.59	0.26	2.05	0.76	2.51	1.66	5.53	1.20	0.53	0.07	3.70	3.94
	1894†	0.66	0.18	1.97	0.67	2.19	1.58	4.35	0.96	0.49	0.04	1.93	2.77
	1895†	0.63	0.22	2.16	0.77	2.28	1.79	5.73	1.04	0.49	0.11	1.25	1.82
	*1896†	0.66	0.13	2.00	0.60	2.02	1.75	5.19	1.04	0.46	0.11	0.96	1.47
	1897†	0.74	0.22	2.12	0.67	2.02	1.74	4.51	1.03	0.51	0.10	2.10	1.36

\* The facts for these years are for 53 instead of 52 weeks; corrections have therefore been made in calculating the rates.

† The rates of mortality for the years subsequent to 1890 refer to the City of Manchester as enlarged by the Act of that year. The rates for 1890 and for previous years are those for the three Unions of Manchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."



TABLE H, 1897.—POPULATION, AREA, DENSITY.      TOTAL BIRTHS AND DEATHS,  
WITH BIRTH AND DEATH RATES.

[INSTITUTION POPULATIONS, BIRTHS AND DEATHS, DISTRIBUTED.]

STATISTICAL DIVISIONS	Estimated Population	Area in Acres	Persons to an Acre	BIRTHS		DEATHS	
				Total	Rate per 1,000	Total	Rate per 1,000
City of Manchester .....	536,426	12,788	42	17,629	32·86	11,990	22·35
I. Manchester Township..	145,689	1,646	89	5,113	35·10	4,181	28·70
II. North Manchester .....	141,909	7,191	20	4,714	33·22	2,601	18·33
III. South Manchester .....	248,829	3,951	63	7,802	31·35	5,208	20·93
I. { Ancoats .....	45,737	400	114	1,732	37·87	1,345	29·41
Central .....	36,211	748	48	1,018	28·11	1,030	28·44
St. George's.....	63,740	498	128	2,363	37·07	1,806	28·33
II. { Cheetham .....	31,006	919	34	1,066	34·38	505	16·29
Crumpsall .....	9,556	733	13	190	19·88	106	11·09
Blackley .....	8,024	1,840	4	226	28·17	121	15·08
Harpurhey .....	11,881	193	62	470	39·56	223	18·77
Moston .....	6,581	1,297	5	229	34·80	120	18·23
Newton Heath .....	37,063	1,350	27	1,065	28·73	739	19·94
Bradford .....	22,896	288	79	923	40·31	499	21·79
Beswick .....	10,788	96	112	400	37·08	187	17·33
Clayton .....	4,114	475	9	145	35·25	101	24·55
III. { Ardwick .....	37,472	509	74	1,373	36·64	804	21·46
Openshaw .....	30,803	581	53	939	30·48	526	17·08
West Gorton .....	27,680	342	81	961	34·72	567	20·48
Rusholme and Kirk. ...	19,494	1,396	14	495	25·39	289	14·83
Chorlton-upon-Medlock	61,580	646	95	1,570	25·50	1,220	19·81
Hulme.....	71,800	477	151	2,464	34·32	1,802	25·10

TABLE J, 1897.

BIRTHS REGISTERED IN THE CITY OF MANCHESTER, IN ITS MAIN DIVISIONS,  
AND IN DISTRICTS; DISTINGUISHING LEGITIMATE AND ILLEGITIMATE BIRTHS;  
ALSO THE PROPORTION OF MORTALITY AMONG INFANTS OF BOTH CLASSES UNDER  
ONE YEAR OF AGE.

STATISTICAL AREAS	BIRTHS		Percentage of Illegitimate Births to Total Births	DEATHS UNDER 1 YEAR		PROPORTION OF DEATHS UNDER 1 YEAR PER 1,000 BIRTHS		
	Total	Illegitimate		Total	Of Illegitimate Children	Total	Legitimate	Illegitimate
City of Manchester.....	17,629	729	4'14	3,431	273	195	187	374
(DIVISIONS)								
I. Manchester Township	5,113	259	5'06	1,134	98	222	213	378
II. North Manchester.....	4,714	108	2'29	788	45	167	161	417
III. South Manchester.....	7,802	362	4'64	1,509	130	193	185	359
I. { Ancoats .....	1,732	66	3'81	395	22	228	224	333
Central .....	1,018	78	7'67	264	22	259	257	282
St. George's .....	2,363	115	4'86	475	54	201	187	470
II. { Cheetham .....	1,066	24	2'25	138	13	129	120	542
Crumpsall .....	190	9	4'74	20	1	105	105	111
Blackley.....	226	4	1'77	33	1	146	144	250
Harpurhey.....	470	5	1'06	87	1	185	185	200
Moston .....	229	4	1'75	34	2	149	142	500
Newton Heath .....	1,065	26	2'44	206	14	193	185	538
Bradford .....	923	28	3'03	166	12	180	172	429
Beswick .....	400	4	1'00	65	0	162	164	...
Clayton .....	145	4	2'76	39	1	269	270	250
III. { Ardwick .....	1,373	42	3'06	262	9	191	190	214
Openshaw .....	939	24	2'56	177	15	189	177	625
Gorton (West) .....	961	39	4'06	177	11	184	180	282
Rusholme and Kirk.	495	23	4'64	73	8	147	138	348
Chorlton-on-Medlock	1,570	131	8'34	271	39	173	161	298
Hulme .....	2,464	103	4'18	549	48	223	212	466

TABLE K, 1897.

INFANTILE MORTALITY IN MANCHESTER CITY, AND ITS THREE MAIN DIVISIONS.

DEATH-RATES UNDER ONE YEAR PER 1,000 BIRTHS.

CAUSES OF DEATH	City of Manchester	Manchester Township	North Manchester	South Manchester
All Causes .....	194·62	221·79	167·16	193·41
Measles .....	8·05	9·19	5·09	9·10
Whooping Cough .....	6·69	6·65	3·61	8·59
Other Com: Infectious Diseases†	0·57	0·39	1·06	0·38
Diarrhoea .....	38·52	45·37	34·79	36·27
Tubercular Diseases‡ .....	11·17	10·37	7·21	14·10
Convulsions .....	10·04	11·54	6·58	11·15
Other Nervous Diseases§ .....	5·05	3·32	6·79	5·13
Lung Diseases .....	33·07	37·36	31·18	31·40
Wasting Diseases   .....	51·05	62·39	42·85	48·58
Suffocation .....	0·23	0·39	0·21	0·13
Found dead in bed ....	5·33	7·24	3·18	5·38

† These are Smallpox, Scarlatina, Diphtheria, Membranous Croup, and various forms of “Fever,” including the chief forms of Typhus and Typhoid

‡ These are Phthisis, Tubercular Meningitis (Hydrocephalus), Tabes Mesenterica, and General Tuberculosis (Scrofula).

§ These are Meningitis, and other diseases of the Brain and Spinal Cord.

|| These are Premature Birth, and such ill-defined causes as Atrophy, Marasmus, Debility, Inanition, &c.



TABLE L, 1897.—CITY OF MANCHESTER. ANNUAL RATES OF MORTALITY PER 1,000 PERSONS LIVING AT ALL AGES, IN THE CITY OF MANCHESTER AND IN ITS STATISTICAL AREAS, FROM CERTAIN DISEASES AND GROUPS OF DISEASES.

CAUSES OF DEATH	City of Manchester	Manchester Township	North Manchester	South Manchester	City of Manchester Average of 6 years 1891-96
All Causes .....	22·35	28·70	18·33	20·93	23·28
Smallpox .....	...	...	...	...	0·02
Measles .....	1·17	1·69	0·63	1·18	0·69
Scarlet Fever .....	0·23	0·27	0·29	0·17	0·28
Typhus Fever .....	0·00	0·01	...	...	...
Whooping Cough .....	0·56	0·68	0·29	0·64	0·65
Diphtheria, Membranous Croup	0·08	0·08	0·10	0·08	0·25
Ill-defined Fever.....	0·00	...	0·01	0·00	0·01
Enteric Fever .....	0·18	0·17	0·20	0·17	0·24
Influenza .....	0·20	0·21	0·18	0·20	0·29
Diarrhœa, Dysentery .....	1·74	2·33	1·48	1·54	1·13
Erysipelas .....	0·05	0·06	0·06	0·04	0·06
Pyæmia .....	0·03	0·04	0·01	0·03	0·02
Puerperal Fever .....	0·07	0·09	0·08	0·05	0·08
Rheumatic Fever .....	0·07	0·07	0·08	0·08	0·08
Rickets .....	0·07	0·09	0·04	0·07	0·07
Cancer .....	0·74	0·80	0·63	0·76	0·63
Tabes Mesenterica.....	0·22	0·12	0·18	0·31	0·21
Hydrocephalus .....	0·31	0·39	0·16	0·35	0·33
Phthisis .....	2·12	3·35	1·38	1·83	2·07
Scrofula, Tuberculosis .....	0·36	0·54	0·23	0·33	0·39
Premature Birth .....	0·58	0·65	0·54	0·56	0·59
Old Age .....	0·44	0·66	0·29	0·40	0·49
Brain and Nervous Diseases ...	2·02	2·16	1·93	1·99	2·42
Heart Diseases .....	1·74	2·16	1·44	1·66	1·75
Bronchitis .....	2·05	2·70	1·84	1·79	2·61
Pneumonia .....	2·17	2·88	1·89	1·92	2·47
Respiratory Diseases (other) ...	0·29	0·38	0·16	0·30	0·42
Digestive Organs (Diseases of)	1·03	1·13	0·93	1·02	1·07
Urinary Organs (Diseases of)	0·51	0·73	0·35	0·47	0·51

TABLE M, 1897.—CITY OF MANCHESTER.—ANNUAL RATES OF MORTALITY AT SIX GROUPS OF AGES, \* PER 1,000 LIVING AT 168

THOSE AGE GROUPS, FROM CERTAIN PREVALENT DISEASES, AND GROUPS OF DISEASES.

CAUSES OF DEATH	Under 5 Years	5 to 15 Years	15 to 25 Years	25 to 45 Years	45 to 65 Years	Over 65 Years
All Causes .....	81.18	3.70	4.54	10.41	33.03	116.82
Smallpox .....	...	...	...	...	...	...
Measles .....	8.90	0.23	0.01	...	...	...
Scarlatina .....	1.35	0.23	0.06	...	...	...
Diphtheria, Memb. Croup.....	0.48	0.11	...	...	0.01	...
Whooping Cough .....	4.32	0.07	...	...	...	...
Fever { Typhus Enteric Continued	...	...	...	...	0.01	0.07
	0.06	0.14	0.25	0.23	0.14	0.07
	...	0.01	...	...	...	0.07
Diarrhoeal Diseases.....	13.27	0.03	0.02	0.06	0.36	2.19
Tubercular Diseases .....	6.06	0.78	1.68	3.72	4.43	2.99
Diseases of ... { Brain Heart Lungs Digestive System Urinary System	5.50	0.36	0.25	0.73	4.07	17.34
	0.16	0.30	0.43	1.15	5.72	18.07
	16.18	0.57	0.69	1.62	7.16	30.46
	3.58	0.16	0.19	0.47	1.82	4.88
Other Diseases .....	0.18	0.08	0.17	0.37	1.59	4.74
	21.13	0.65	0.79	2.05	7.71	35.93

\* For death-rates at all ages, see Table L.

TABLE N, 1897.—ANNUAL RATES OF MORTALITY IN STATISTICAL DIVISIONS, AT SIX GROUPS OF AGES,\* PER 1,000 LIVING AT THOSE AGE GROUPS, FROM CERTAIN PREVALENT DISEASES, AND GROUPS OF DISEASES.

CAUSES OF DEATH	Under 5 Years			5 to 15 Years			15 to 25 Years		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes .....	104'22	63'02	78'48	4'80	3'29	3'30	4'99	4'42	4'34
Smallpox .....	...	...	...	...	...	...	...	...	...
Measles.....	12'85	4'69	9'11	0'34	0'06	0'27	0'03	...	...
Scarlatina .....	1'65	1'62	1'02	0'25	0'27	0'18	0'07	0'07	0'04
Diphtheria, Memb. Croup .....	0'55	0'43	0'46	...	0'18	0'13	...	...	...
Whooping Cough.....	5'16	2'21	5'11	0'16	...	0'05	...	...	...
Fever.....	Typhus.....	...	...	...	...	...	...	...	...
	Enteric .....	0'05	0'11	0'03	0'13	0'12	0'16	0'31	0'17
	Continued.....	...	...	...	...	0'02	...	...	...
Diarrhœal Diseases.....	17'41	10'77	12'32	...	...	0'05	0'03	...	0'02
Tubercular Diseases .....	7'36	3'39	6'91	0'94	0'57	0'80	1'83	1'66	1'61
Diseases of	Brain.....	5'98	4'90	5'57	0'53	0'33	0'27	0'21	0'14
	Heart .....	0'33	0'05	0'13	0'41	0'36	0'20	0'65	0'21
	Lungs .....	20'48	14'38	14'71	0'78	0'63	0'40	0'79	0'55
	Digestive System ...	4'34	2'96	3'51	0'22	0'12	0'15	0'07	0'48
	Urinary System.....	0'49	...	0'10	0'03	0'09	0'09	0'28	0'17
Other Diseases.....	27'57	17'51	19'49	1'00	0'54	0'51	0'72	0'97	0'73

CAUSES OF DEATH	25 to 45 Years			45 to 65 Years			Over 65 Years		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes .....	14'96	8'61	8'75	43'30	26'27	30'29	131'32	108'39	113'72
Smallpox .....	...	...	...	...	...	...	...	...	...
Measles.....	...	...	...	...	...	...	...	...	...
Scarlatina .....	...	...	...	...	...	...	...	...	...
Diphtheria, Memb. Croup.....	...	...	...	0'05	...	...	...	...	...
Whooping Cough .....	...	...	...	...	...	...	...	...	...
Fever.....	Typhus.....	...	...	0'05	...	...	0'29	...	...
	Enteric .....	0'16	0'38	0'19	0'19	0'06	0'15	...	0'28
	Continued .....	...	...	...	...	...	...	0'28	...
Diarrhœal Diseases.....	0'14	0'05	0'03	0'63	0'06	0'36	1'44	2'28	2'52
Tubercular Diseases .....	6'08	2'71	2'90	7'13	1'90	4'11	5'75	1'42	2'38
Diseases of	Brain.....	0'75	0'75	0'71	5'09	4'14	3'39	12'93	18'21
	Heart .....	1'70	0'90	0'97	7'27	4'75	5'28	15'52	18'21
	Lungs.....	2'47	1'38	1'26	9'65	5'93	6'28	40'80	24'75
	Digestive System....	0'57	0'30	0'51	1'84	2'01	1'71	4'31	3'13
	Urinary System.....	0'54	0'23	0'34	2'42	0'67	1'56	4'60	5'97
Other Diseases.....	2'54	1'91	1'83	8'97	6'76	7'45	45'69	33'85	31'96

\* For death-rates at all ages, see Table L.



TABLE O, 1897.

MANCHESTER.—CERTIFICATION OF THE CAUSES OF DEATH IN THE MAIN  
DIVISIONS AND IN DISTRICTS.

STATISTICAL AREAS	Total Deaths	Certified by		Not Certified	Proportion per cent. of Deaths		
		Registered Medical Practitioners	Coroner		Certified by		Not Certified
					Regist'd Medical Prac- titioners	Coroner	
City of Manchester .....	11,990	11,057	790	143	92·2	6·6	1·2
(DIVISIONS)							
I. Manchester Township ...	4,181	3,822	306	53	91·4	7·3	1·3
II. North Manchester .....	2,601	2,411	173	17	92·6	6·7	0·7
III. South Manchester .....	5,208	4,824	311	73	92·6	6·0	1·4
I. { Ancoats .....	1,345	1,220	100	25	90·7	7·4	1·9
{ Central .....	1,030	929	91	10	90·2	8·8	1·0
{ St. George's .....	1,806	1,673	115	18	92·6	6·4	1·0
II. { Cheetham .....	505	465	39	1	92·1	7·7	0·2
{ Crumpsall ..	106	98	7	1	92·5	6·6	0·9
{ Blackley .....	121	112	9	...	92·6	7·4	...
{ Harpurhey .....	223	209	14	...	93·7	6·3	...
{ Moston .....	120	107	13	...	89·2	10·8	...
{ Newton Heath .....	739	690	45	4	93·4	6·1	0·5
{ Bradford .....	499	457	32	10	91·6	6·4	2·0
{ Beswick .....	187	175	11	1	93·6	5·9	0·5
{ Clayton .....	101	98	3	...	97·0	3·0	...
III. { Ardwick .....	804	732	55	17	91·1	6·8	2·1
{ Openshaw .....	526	494	29	3	93·9	5·5	0·6
{ Gorton (West) .....	567	530	26	11	93·5	4·6	1·9
{ Rusholme and Kirk. ...	289	268	17	4	92·7	5·9	1·4
{ Chorlton-upon-Medlock	1,220	1,136	69	15	93·1	5·7	1·2
{ Hulme .....	1,802	1,664	115	23	92·3	6·4	1·3

TABLE P, 1897.—PARTICULARS AS TO MANCHESTER PATIENTS UNDER TREATMENT IN THE SEVERAL FEVER HOSPITALS DURING THE YEAR; ALSO OF PATIENTS FROM OUTSIDE DISTRICTS SENT TO MONSALL AND CLAYTON DURING THE SAME PERIOD.

DISEASE	HOSPITAL	In Hospital commence- ment of year	Admitted	Discharged	Died	Remaining in Hospital close of year
SMALLPOX .....	Clayton Hospital .....	...	...	...	...	...
	Total .....	...	...	...	...	...
SCARLET FEVER ...	Monsall .....	207	1,365	1,162	94	316
	Pendlebury .....	20	62	75	7	...
	Other Hospitals.....	...	1	1	...	...
	Total .....	227	1,428	1,238	101	316
DIPHThERIA .....	Monsall .....	4	44	36	10	2
	Pendlebury .....	...	...	...	...	...
	Other Hospitals .....	...	...	...	...	...
	Total .....	4	44	36	10	2
ENTERIC FEVER...	Monsall .....	26	263	192	31	66
	Pendlebury .....	...	...	...	...	...
	Other Hospitals .....	3	21	10	10	4
	Total .....	29	284	202	41	70
TYPHUS FEVER ...	Monsall .....	...	...	...	...	...
	Pendlebury .....	...	...	...	...	...
	Other Hospitals .....	...	...	...	...	...
	Total .....	...	...	...	...	...
OTHER ACUTE DISEASES .....	Monsall .....	2	133	100	28	7
	Pendlebury .....	...	2	2	...	...
	Other Hospitals .....	...	...	...	...	...
	Total .....	2	135	102	28	7
ALL DISEASES.....		262	1,891	1,578	180	395

PATIENTS SENT TO MONSALL AND CLAYTON, FROM DISTRICTS OUTSIDE THE CITY,  
DURING THE YEAR 1897.

DISEASE	Withing- ton	Stretford	Moss Side	winton & c	Sale	Prestwich	Gorton	Failsworth	Other Districts
Smallpox .....	...	...	...	...	...	...	...	...	...
Scarlatina .....	114	17	22	...	18	51	14	2	...
Diphtheria .....	2	1	...	...	7	1	1	...	...
Enteric Fever .....	4	9	4	3	...	1	14	2	...
Other Diseases.....	2	2	1	1	1	...	4	...	3







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